

Charles University in Prague

Faculty of Social Sciences
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MASTER THESIS

Determinants of Financial Development

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Declaration of Authorship

The author hereby declares that he compiled this thesis independently, using only the listed resources and literature, and the thesis has not been used to obtain a different or the same degree.

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Prague, May 16, 2014

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Abstract

The paper studies effects of country level determinants on the rate of financial development and, in particular, assesses the empirical question whether democracy and political freedom can enhance financial development, as measured by Bank Private Credit to GDP and Liquid Liabilities to GDP. Using Fixed Effects estimation techniques and a panel data for a list of 39 countries over the period 1990 to 2011, we provide evidence that suggests positive link between political openness and financial development. The empirical evidence also confirms financial openness and real per capita income to be positively correlated to financial deepening and in contrast, we find that size of financial sector does not spur the rate of financial development.

JEL Classification F12, F43, G28, G29

Keywords Financial Development, Freedom House Survey, Political Freedom, Financial Openness, Fixed Effects Panel Data Analysis

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Acronyms

AREAER Annual Report on Exchange Arrangements and Exchange Restrictions

FD Financial Development

GDP Gross Domestic Product

GFDD Global Financial Development Dataset

IMF International Monetary Fund

OECD Organisation for Economic Co-operation and Development

WDI World Development Indicators

Master Thesis Proposal

Author	Bc. Eri Bzhalava
Supervisor	doc. Roman Horvath, Ph.D.
Proposed topic	Determinants of Financial Development

Topic characteristics The positive effect of financial development on economic growth makes a strong incentive for researchers to study the factors that affect the financial development. Voghouei, Azali, & Jamali (2011) sum up numbers of studies devoted to the determinants of financial development following way: legal traditions, institutions, government intervention, openness policy, political economy factors and some other factors, like culture and macroeconomic situation can be main instruments to promote financial development. Although, there is a solid literature providing theoretical overview of the determinants of the financial development, further research is needed to estimate impact of each determinant on financial development and each other.

In this master thesis will be used the Global Financial Development Database. The GFDD contains extensive dataset of financial development for 203 countries. The dataset has been last updated in 2013 and includes annual data from 1960 through 2011. The database is built on a '4x2 framework'. Precisely, it contains degrees of 1) depth, 2) access, 3) efficiency, and 4) stability. These four measures capture 1) financial institutions (banks, insurance companies etc.) and 2) financial markets (stock markets and bond markets).

Hypotheses

- Hypothesis #1: Political freedom, particularly protection of political rights and civil liberties, is positively linked to the rate of financial deepening;
- Hypothesis #2: There is a significant positive correlation between financial openness and rate of financial development;

- Hypothesis #3: Real income per capita has a significant positive impact on the deepening of a financial sector;
- Hypothesis #4: Deeper scaled financial sector does not necessarily cause higher rate of financial development.

Methodology In this study we will apply the error component models to analyze the panel data.

Fixed Effects model is usually well suited for analyzing the impact of variable that vary over time. The model explores the relationship between explanatory and response variables within entity. Each explanatory variable has its own characteristics that might or might not affect explained variable. The equation for the fixed-effect transforms to:

$$y_{it} = \alpha_i + x_{it}b + u_{it}$$

Where α_i is different intercept for each individual and

$$\hat{\alpha}_i = \bar{y}_i - \bar{x}_i b$$

Fixed-effects model can be represented also by using binary variables.

Outline

1. Introduction
2. Theoretical Framework
3. Data and Methodology
4. Empirical Verification
5. Conclusion

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Chapter 1

Introduction

Financial development has first order positive effect on long run economic growth. On the macroeconomic level, Levine & Zervos (1998) argued that banking and financial markets development is relevant and favorable predictor of real growth. In addition, on the microeconomic level, Demircuc-Kunt & Maksimovic (1996a) showed that good financial institutions and access to financial resources play solid role for firms' good performance as well as for whole industries. Large number of theoretical and empirical researches suggests the same results, that there is a steady finance-growth relation.

The effect of financial development on economic growth makes a strong incentive for researchers to study the factors that affect the financial development itself. Although, there is a solid literature providing theoretical overview of the determinants of the financial development, empirical researches are somewhat incomplete and further research is needed to estimate impact of each determinant on financial development and each other. Voghouei, Azali, & Jamali (2011) sum up numbers of studies devoted to the determinants of financial development following way: legal traditions, institutions, government intervention, openness policy, political economy factors and some other factors, like culture and macroeconomic situation can be main instruments to promote financial development.

Our paper departs from the extant literature by focusing on political freedom effects on financial development. The main contribution of our thesis is using a list of updated datasets and somewhat original proxy measure of political economy factors. Unlike to previous empirical studies, the freedom in the world survey is applied as an estimate of political freedom and democracy. Other variables are selected from various sources: (1) Bank Private Credit to

GDP and Liquid Liabilities to GDP, the response variables to evaluate rate of financial development are from the World Bank's Global Financial Development Dataset; (2) The World Bank's World Development Indicators dataset is a source of independent variables; (3) Further, we incorporate Kaopen index associated with Chinn and Ito dataset and (4) two alternative measures of political freedom and democracy are utilized from the Freedom in the World Survey and PolityIV project. We apply Fixed Effects estimation technique to analyze a panel data of 39 countries, including OECD high-income countries and middle-income countries from Europe and Central Asia, over the period 1990 to 2011.

The existing literature argues political, legal and cultural institutions to be driving force of financial development. The rule of law based governance, property right protection and strong mechanism of contract enforcement is considered to be the ground for spurring financial development.

A number of studies associate aforementioned fundamental political and legal institutions to be highly dependent on democracy, a system that is characterized by population's involvement in a country's political life. In a democratic country political life is highly competitive, public office positions are elective based on popular voting and governors are limited in their actions by law based constraints. For instance, Haber, North, & Weingast (2008) outline that democracy and competitive political environment effectively leads to higher competition in financial sector, since rulers are limited to control or suppress financial sector. La Porta, Lopez-de Silanes, & Shleifer (2002) link democracy to financial development based on the fact that democratic systems discourage government ownership of banks and other financial institutions. Siegle, Weinstein, & Halperin (2004) further add that democracy has a positive effects on financial development since it supports balance and self-correction mechanisms, openness and other important institutions.

Generally, all the aforementioned reasoning supports a suggestion that political freedom and democracy can boost financial development. However, as Yang (2011) observes, there are few empirical studies directly testing the hypothesis and most of them apply cross sectional data analysis without treating country specific factors.

The paper closely follows model specification suggested by Chinn & Ito (2006), however we apply a modified vector of explanatory variables. To diminish existing endogenous problem, 5 years *rate* of financial development is regressed on the *level* of financial development, political freedom, capital ac-

count openness and other regressors. All explanatory variables are lagged by 5 years. We similarly to Baltagi, Demetriades, & Law (2009) and Chinn & Ito (2006) keep number of independent variables fairly small to keep better interpretability of coefficients. The empirical part of the study, besides the main regression, provides a specification with an alternative measure of political freedom and democracy to check robustness of our suggestions. Additionally, we provide regressions with dropped explanatory variable to evaluate whether results are stable to such modifications.

In contrast to the empirical study by Yang (2011), which argued that statistically significant link between democracy and financial development disappears once panel data model applied, we find democracy to have statistically significant positive impact on the rate of financial development by utilizing Fixed Effects panel data estimation techniques. The results support the suggestion that competitive political system can enhance financial development. Furthermore, the empirical results confirm a few other important hypotheses:

First, our findings are in line with the main conclusion of Chinn & Ito (2006; 2002), arguing that a country level decision of financial openness enhances rate of financial development. We utilize a comprehensive index measuring a country's 'de jure' capital account openness. All output results indicate statistical significant link between financial openness and financial development. Second, we provide an empirical evidence that real per capita income has a positive impact on financial development. The results are in line with previous studies and common wisdom. Two main explanations of a such intercorrelation are following: (1) wealth effect of higher impact increases demand for a better financial sector and (2) the variable can be seen as a proxy measure of institutional and technological development. Third, we find financial development level lagged by 5 years not to be positively linked to financial growth rate. Fourth, based on the empirical results one could argue that for the selected countries total tax to GDP and GDP deflator level are positively correlated to the rate of financial development.

Our empirical study closely follows treatment suggested by Chinn & Ito (2006; 2002), however we extend set of explanatory variables and most importantly incorporate a measure evaluating democracy and political freedom. The Chinn and Ito model regresses the rate of financial development on the level of financial development and other explanatory variables, where all regressors are lagged by five years. The main advantage of the estimation technique is that using five years horizon effectively diminishes endogeneity problem. Un-

like Chinn & Ito (2006; 2002), which utilizes OLS and 2SLS approaches, we apply Fixed Effects model to control for country specific factors.

This thesis is structured as follows, the second chapter provides a comprehensive overview of the theoretical framework of the topic. The chapter starts with description of finance-growth nexus, which underlines importance of financial development, followed by reviews of the existing theoretical and empirical studies and provides list of determinants that are considered to have important effect on financial development. Chapter 3 presents description of data and methodology that is applied for the empirical part of the paper. It includes detailed description of dependent and explanatory variables. In Chapter 4, methodology described in Chapter 3 is utilized and results are presented. Second part of the chapter provides robustness checks: analysis with an alternative measure of political freedom and analysis when a regressors is drop, to estimate whether the results stay stable. Chapter 5 concludes the finding of the thesis and provides final remarks. The references and the annexes include all the information about sources cited in the paper and all the relevant data descriptive and empirical part of the thesis.

Chapter 2

Theoretical Framework

2.1 Chapter Overview

In this chapter, an overview of existing literature is provided on the topic of determinants of financial development. First section contains description of existing literature on finance-growth nexus. It stresses how financial development is linked to the economic growth and points to the importance to study the determinants of financial development.

The second section presents some influential researches addressing the topic on financial development factors. The literature overview follows the framework suggested by Voghouei *et al.* (2011) drawing following groups of determinants affecting on financial system: (a) legal traditions, (b) institutions, (c) financial liberalization, (d) openness policy: trade and capital account openness, (e) political economy factors and (f) other factors.

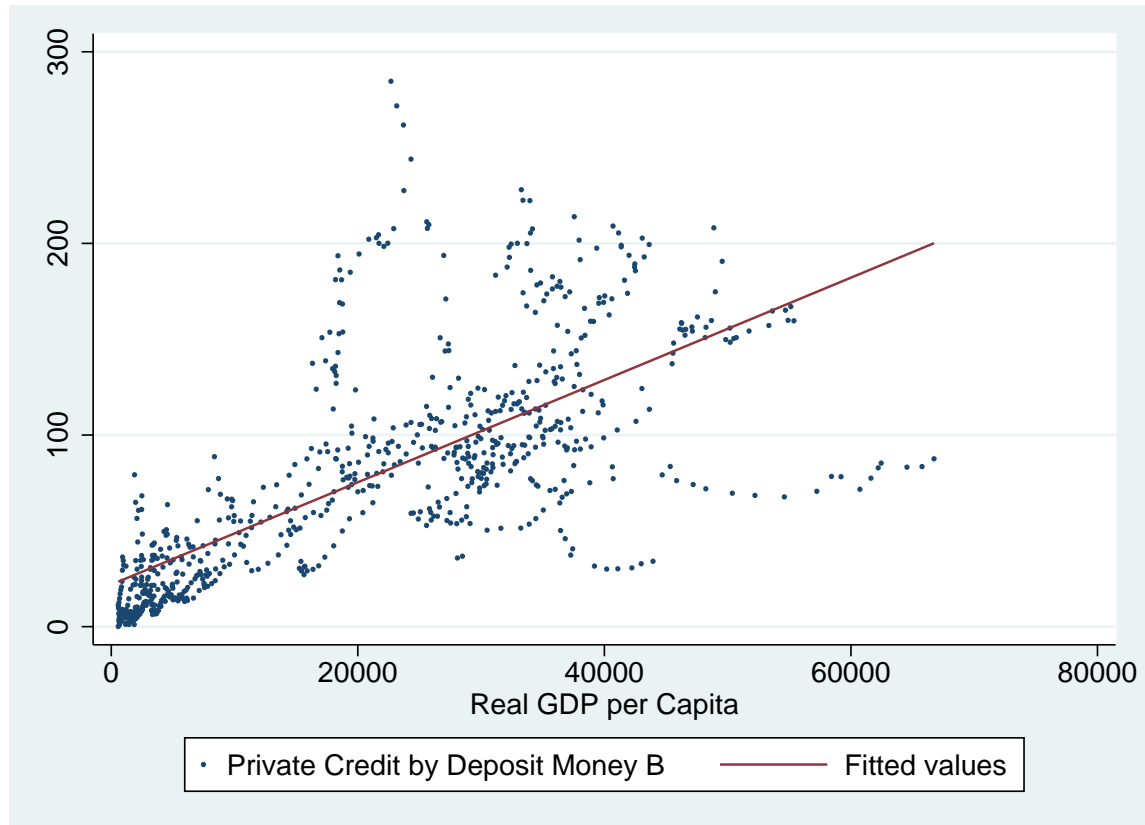
2.2 Finance-Growth nexus

A discussion about the relationship between finance and growth is not a new topic. Schumpeter (1934) pointed out the importance of financial systems in advancing innovations and concluded that economies with better-developed financial system have higher rate of economic growth. Robinson (1979) argued contrary causality effect; countries with higher economic growth expectations try to have well-developed financial systems that can provide finances needed to back the expected economic growth. That is to say, the level of economic development leads financial development.

The scatter plot Figure 2.1 shows correlation between real GDP per capita

and financial development measured by Bank private credit to GDP. The graph illustrates positive link between the two variables.

Figure 2.1: Bank private credit to GDP & Real GDP per Capita - Fitted Values



Source: GFDD, WDI

Modern theories stressed significance of financial development for economic growth in different ways. Auerbach & Uddin Siddiki (2004) argued that developed financial systems (1) increase the productivity in the usage of investment resources and (2) supports higher rate of savings. However, this theory was contradicting one of the most accepted assumptions that economic resources are allocated efficiently.

Endogenous growth theory introduced by Romer (1986) overcame this contradiction by assuming that if an economic agent increases its saving, it has spillover effect on other economic agents and consequently, the productivity of economy and GDP growth rate increases.

Levine (2005) summarizes the existing literature on the finance-growth nexus by drawing five financial system functions that decreases transaction and information costs. These activities are:

- Providing information ex ante about available investments and supporting capital allocation process
- Monitoring investment projects and advancing corporate governance by providing finance
- Promoting the trading, diversification, and risk management
- Increasing level of savings
- Supporting the exchange process

As a result, financial development decreases level of market frictions and supports long-term real growth. The idea that financial development is positively linked to long-run economic development is supported by large body of empirical researches. To discuss them is out of goal of this topic, but the fact itself further motivates researchers to study factors that affect financial development itself.

2.3 Determinants of Financial Development

There is a large number of factors affecting financial development and various literature group them in different ways. Voghouei *et al.* (2011) suggest the following categories of determinants: 1) legal traditions, 2) institutions, 3) financial liberalization, 4) openness policy, 5) political economy factors and 6) other factors.

Legal Traditions:

One of the most influential theory in describing the role of the legal traditions, "Law and Finance" by López de Silanes *et al.* (1998), highlights the role of legal institutions to explain why level of financial development varies greatly among countries. The first part of law and finance theory points to the importance of legal traditions ability to ensure protection of property rights, and help contract enforcement mechanism, which defines the way creditors and shareholders are treated.

In the second part of the theory, the differences among countries is described through existence of different legal traditions, which were spread across the world during conquests and European colonization. Two types of legal

traditions are distinguished: civil law (French, German and Scandinavian) and common law (British). The research points that countries with British common law have better financial system. On the other hand the most unfavorable legal tradition is French common law.

Another approach to explain differences was to look how adaptable legal traditions are (Merryman, Clark, & Haley 1994). Based on this idea, Beck, Demirgüç-Kunt, & Levine (2001) develop dynamic law and finance theory, where the main focus is how adaptable is a legal tradition and if it is able to reshape itself according to the level of financial and economic development.

Institutions:

Endowment theory first advanced by Acemoglu, Johnson, & Robinson (2005), suggests that the differences in economic institutions are the main determinants of the level of economic and financial development. In some countries, institutions are supporting rule of law and therefore creating an environment, where long run investments are rational. At the same time in other countries, institutions are harmful for progress. The differences are explained mainly through colonization strategies, whether Europeans had long run goals, and therefore established functional institutions, or the only interest was to transfer resources from the colonized place.

Law & Habibullah (2009) provides brief summary of existing empirical literature and underlines several important issues. The effect of political economy factors and institutions on the level of FD is not well documented. Rajan & Zingales (2003) study the determinants of financial development. Particularly, they assess the effects of trade and capital markets openness. The main goal of the paper is to analyze the factors that made financial development volatile over twentieth century across the countries. For example, taking into account a number of measures most countries had better financial system in 1913 compared to the financial development level in 1980. Exploring dataset of selected twenty-four countries, the authors develop the interest group theory that emphasizes the role of trade and financial openness in reduction negative effects that influential economic agents might have. The incumbents, the influential economic agents, are contradicting financial development since they get abnormal returns from financial repression and from poor competition on the market. The paper provides empirical evidence to support the openness hypothesis. In the empirical study by Rajan & Zingales (2003), data used is limited and it

contains only the pre-World War II time spread. As a result the conclusions might be out of date.

Other authors addressed related questions as well, but most of them examined particularly the importance of legal systems and its origins like López de Silanes *et al.* (1998) and whether these factors affect on financial systems development. However, in Beck *et al.* (2003) empirically documented that association of countries' endowment to the financial intermediary level is more robust than in case of legal traditions. In the research, 'settler mortality' theory is directly applied to explaining factors affecting financial development more explicitly. The empirical results long run institutional endowment meters for financial development (Beck *et al.* 2003).

Pagano & Volpin (2002) argue that balance of power distribution among social and economic groups have strong effect how regulation and enforcement mechanisms are formed across countries. The main idea is that private interests of these groups and its members can affect on financial development in a way that favors their goals. Rajan & Zingales (2003) further clarifies role of influential groups in the process of forming financial systems. They support the idea, that the decision makers might have incentive not to support development of effective and competitive financial system in case it is opposing their personal interests. Particularly, interest of incumbents are discussed which would be against of open, transparent and competitive financial system in favor of financial system that supports their prosperity.

Financial Liberalization:

Arestis (2006) suggests that financial liberalization can be seen as a sum of the following components: privatization of government owned financial institutions and banks, guarantee of free entry into the financial sector and central bank independence, abolishment of credit control tools and implementation of loose interest rates control mechanism. Liberalizing financial markets should lead to better allocation of resources, higher level of investments and higher efficiency.

There are number of controversial theories, which see financial liberalization in different ways. Pro-liberalization theories highlight the fact that minimum reserve requirements and interest rate control tools can be seen as taxes, which as a result makes whole financial sector to shrink and be less effective (Fry 1995). Contrary to that view, other researchers give higher weight to information asymmetry on financial markets (Schiantarelli, Atiyas, Gerard Caprio, Harris,

& Weiss 1993). Therefore, financial liberalization does not necessarily lead to financial development.

Other point against financial liberalization is that it might cause fragility of financial markets and banking sector. The empirical evidence shows that banking crisis is more likely to happen in countries with more liberalized financial systems. However, the risk is reducing if the economic institutions are well developed (Demirguc-Kunt & Maksimovic 1996b).

Openness policies. Trade Openness:

It has been observed that the significant growth in trade and capital account liberalization is convenient for country's welfare, leading to openness in international trade and capital flow, which could develop its financial markets.

If we analyze the trade openness, it is said that the export and import industries can be stimulated by a well-opened financial sector. This financial sector will address the savings into the private sector, empowering the economy to specialize and benefit from the economies of scale, which lead to lowering costs. This will allow entrepreneurs to initiate profitable projects. Hence as it is said above, the financial development contributes to trade openness. Nevertheless this can be seen in the opposite direction too; Do & Levchenko (2004) pointed that the country's financial development is an endogenous variable, so that trade will influence it.

Huang & Temple (2005) find that raise in level of market openness results increase in financial depth. In addition, (Beck *et al.* 2003) points out that countries with better financial systems are more likely to have more manufactured goods exports to GDP more merchandise exports. Levine (2001) shows that easing restrictions on international portfolio flows will affect on liquidity of stock markets positively, and allowing more foreign based bank to be present affect on the performance of inner banking system positively.

Openness policies. Capital Account Openness:

Chinn & Ito (2002) find that capital control strongly is connected with country's financial development. The paper addresses the link between capital account openness and the level of financial development. The authors by providing the precise literature review, highlight the necessity of further researches in the area. Using panel error correction model they manage to deal with business criticality of data and existing endogeneity problem and by incorporating new

broader and more sophisticated measures of financial development and capital control the authors manage to document relevance of capital account openness for financial development. The findings are documented for developed market countries where proxy of financial development is stock market value traded and for transition market countries as well.

Klein & Olivei (1999) stress that capital account liberalization tends to enhance growth via affecting financial system and deepening it. The results hold for industrialized countries but there is little empirical proof for countries which are not members of OECD. As the authors suggest the capital account liberalization leads to reducing transaction and information asymmetry costs, it also supports effective allocation of resources in large financial funds and diminishes presence of moral hazards in management behavior. As a result the paper concludes that financial openness should spur effectiveness of financial sector. Further the authors argue that capital account openness is a key factor in establishing international standards and high professional requirements for financial sectors across countries. The ‘flight to quality’ also leads to innovations and deepens financial sectors in developing economies.

Svaleryd & Vlachos (2002) presented that by offering entirely diversified risk given by institutions with better insurance possibilities, special interest groups pressure for protection will be eliminated and free trade will be promoted. Otherwise, following liberalization, the demand for insurance will increase and this will lead to financial development.

Voghouei *et al.* (2011) pointed out that liberalization of capital markets can apply to both inflows and outflows of capital. Therefore, financial openness of a country should be analyzed using the broad picture of the openness measures.

Taking into consideration the neo-classical model of economic growth, we know that liberalizing the capital account, the international allocation of resources will become more efficient and will have favorable effects. Countries will be willing to allocate their capital in countries with higher interest rates.

These capital inflows and outflows of capital resources will lower the cost of capital in developing countries and increment investment and economic growth temporarily. Moreover, the domestic banking system and the financial innovation that develops the range of financial services can increase, by the subsidiaries of foreign banks.

Political Economy Factors:

Financial development is also well determining by the political economy factors. Voghouei *et al.* (2011) noted that political choice, whether in the form of authoritarian opportunism, oligopolistic capture, or electoral democracy determines the influential forces affecting the development and operation of the financial system.

The politics and finance view suggested by (Beck *et al.* 2001), underlines that a country's financial system under centralized, authoritarian, closed political regimes are more likely to be poorly developed than in countries with free electoral democracy, with open and highly competitive government which is monitored under the check and law based constraints.

The political economic factors influence directly the financial development but also influence indirectly other determinants of financial development. This is explained in the next example: Even though one of the determinants of financial development is the economic institution, this determinant is endogenous and determined by political institutions. Acemoglu *et al.* (2005) argued that different economic institutions lead to different distribution of resources.

Rajan & Zingales (2003) argue that the elite/powerful groups may or may not favor financial development. One reason of the elite for financial repression is political choice because it benefits a special group of people with access to investment capital, corporate control and foreign exchange licenses.

In contrast to development-first approach, which argues that political freedom and democracy could be a product of economic and financial development, Siegle, Weinstein, & Halperin (2004) suggest that democracy could be seen itself as a source of development. The authors argue that democratic systems are 'always stronger, calmer, and more caring' than authoritarian regimes. Based on the reasoning, the paper suggests that electoral democracy and political freedom can spur financial development, since it supports building an important institutions such as checks and balance mechanism, self-control system and rule based constraints.

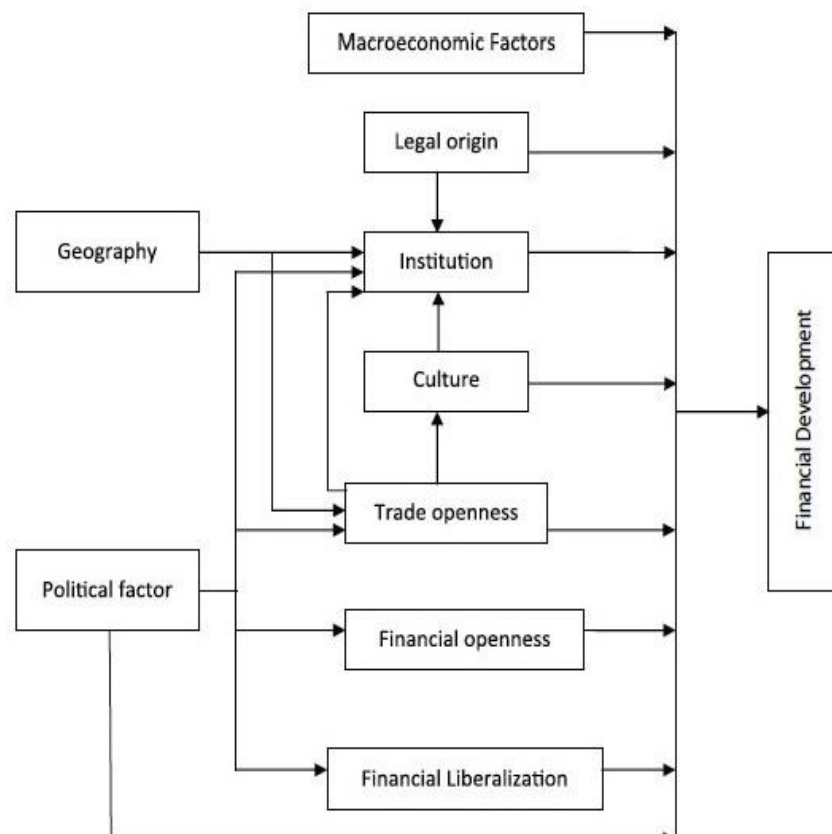
La Porta, Lopez-de Silanes, & Shleifer (2002) suggest that countries with electoral democracy system have more developed financial system. The main pillar of such inter-correlation, as the authors highlight, is that democratic regimes have small incentive to keep commercial banks and other financial institutions in public ownership, which itself supports financial development.

Other factors:

The macroeconomic factors also influence financial development. Inflation, income, investment, and economic growth are argued to have an effect on financial development.

Greenwood & Jovanovic (1990) pointed out that economy higher growth rate, decrease in financial intermediation costs because of raise in competition results larger amount of available funds which are used for investment. Levine (2005) has addressed the importance of income as a determinant of financial development. It was documented that the income per capita and savings rate are positively linked to financial development estimated by amount of bank assets, number of bank branches and amount of employees for 23 developing market economies.

Figure 2.2: Path diagram of financial development determinates



Source: Voghouei, Azali, & Jamali (2011).

Huybens & Smith (1999) suggested that inflation influences financial development in a negative way. The higher the inflation the less real return of money, this leads to less credit. If the financial sector is granting fewer loans, it

means the allocation of the money is being inefficient, and this have a negative effect in financial development. Culture and geography are other two factors that are considered to determine financial development. Nevertheless less research have been done to analyze the relationship and impact they have on financial development.

Stulz & Williamson (2003) underlined the effect of cultural differences, estimated by differences in language and religion, on the level of financial development. The research documented that culture can be factor explaining cross-country variations how investor rights are protected and contracts are enforced, and particularly how creditors rights varies.

As it is shown in the Figure 2.2, explanatory variable are affecting on the independent variables directly and through affecting other dependent variables. We would pay particular attention to the analysis of political factors since as the theory suggests they should be on of the most crucial components in supporting a county's financial development. Voghouei *et al.* (2011) suggests that the political factors not only affect directly on financial development but they also play a important role in forming institutional and openness environment in a country.

2.4 Hypotheses of the Study

We will follow the theoretical framework and test the hypotheses using up to date dataset that includes cross country time series up to 2011 and incorporates somewhat original estimation of political factors. Particularly, we assess effect of democracy and freedom using the political freedom index calculated from the Freedom in the World Survey. Additionally, an alternative more widely utilized measure of democracy Polit2 is applied to see weather the conclusions are persistent. The hypotheses of the paper are following:

- Hypothesis #1: Political freedom, particularly protection of political rights and civil liberties, is positively linked to the rate of financial deepening;
- Hypothesis #2: There is a significant positive correlation between financial openness and rate of financial development;
- Hypothesis #3: Real income per capita has a significant positive impact on the deepening of a financial sector;

- Hypothesis #4: Deeper scaled financial sector does not necessarily cause higher rate of financial development.

Two measures of financial depth, Bank private credit to GDP and Liquid liabilities to GDP, are applied in the thesis to recheck robustness of our suggestions.

Chapter 3

Data and Methodology

3.1 Chapter Overview

Objective of this chapter is to provide detailed description of the data and methodology applied in the thesis. In the first part of the chapter we will describe the variables utilized in the empirical study and motivation of our selection. The dataset is constructed from a number of sources:

- The data of response variable are extracted from the world bank's GFDD;
- For the most part explanatory variables are piked for another world bank's database, WDI;
- Political freedom Index is drawn form The freedom house survey;
- Kaopen index comes form dataset associated with Chinn and Ito.

Additionally we incorporate variable Polity2 from the project PolityIV to see if the results are stable once a different measure of electoral democracy is applied.

3.2 Data

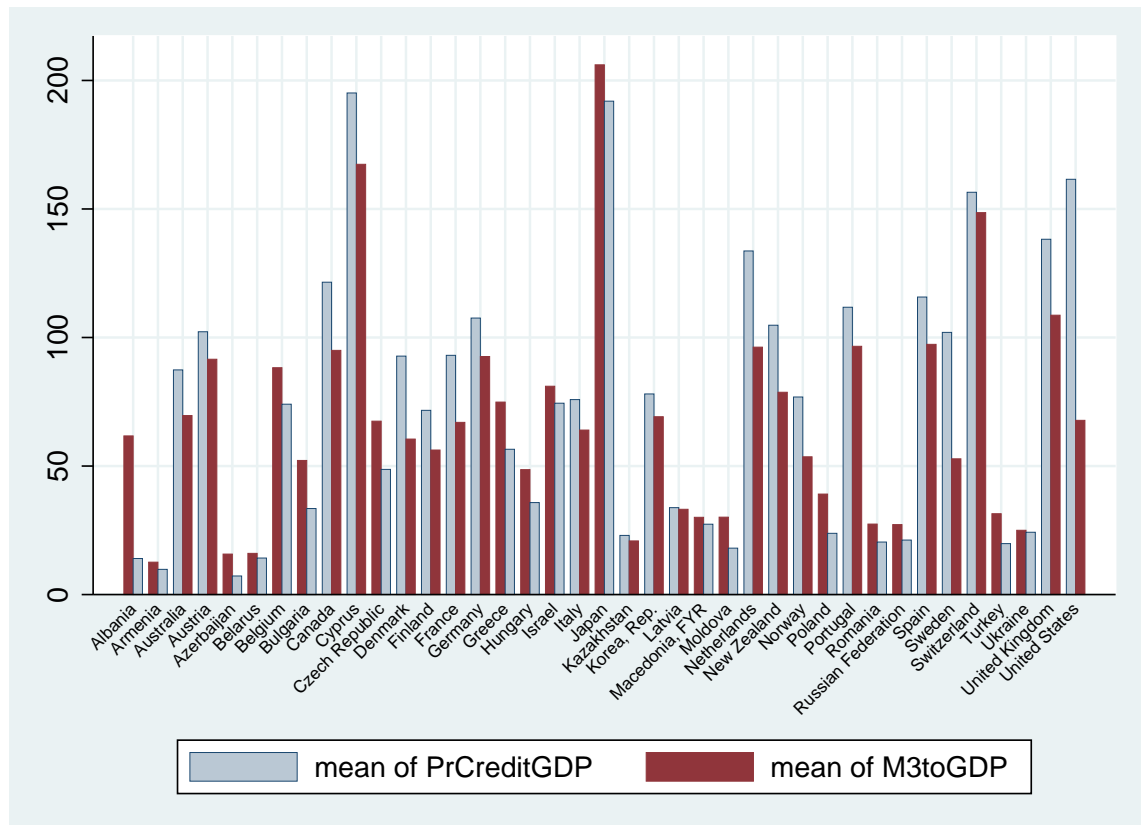
3.2.1 Measures of Financial Development

Generally a deep and efficient financial system provides great advantages for a county. It supports smoothening of consumption over time by saving in good times and spending in bad periods, also makes easier to organize necessary funds for retirement.

The measure of financial development are extracted from the World Bank's Global Financial Development Database (GFDD). The dataset follows a 4X2. More precisely it includes variables capturing four aspects of financial development: depth, access, efficiency and stability. All the components of financial development themselves describe two sides of financial system: financial institutions including banking sector, private insurance companies and so on; and financial markets including stock markets and bond markets.

It is arguable that the most widely used among them is the measures capturing financial depth (size) of a country. Financial depth can be described as the sector of finance compared to the total economy. Particularly it is a bulk of banking sector, financial markets, insurance companies and other financial institutions summed up and studied in comparison to real economic output of a country (Čihák, Demirgüç-Kunt, Feyen, & Levine 2012).

Figure 3.1: Bank private credit to GDP & Liquid liabilities to GDP



Source: GFDD

Wide range of proxies that capture depth of financial system are provided in the updated GFDD: Bank private credit to GDP, Deposit money bank assets to GDP, Non-bank financial institutions' assets to GDP, Deposit money bank

assets to deposit money bank assets and central bank assets, Liquid liabilities to GDP, Central bank assets to GDP, Financial system deposits to GDP, Insurance company assets to GDP, Private credit by deposit money banks and other financial institutions to GDP and Stock market capitalization to GDP Stock market total value traded to GDP.

We incorporate in our thesis two particular measures of financial depth: (1) Bank private credit to GDP and (2) Liquid liabilities to GDP. Comparison of the variable means is provided in the Figure 3.1.

Figure A.1 describes trends of the selected financial development indicators from 1990 to 2011. As the figures depict the two measures had the same trends for the last two decades for the majority of the countries.

Bank private credit to GDP

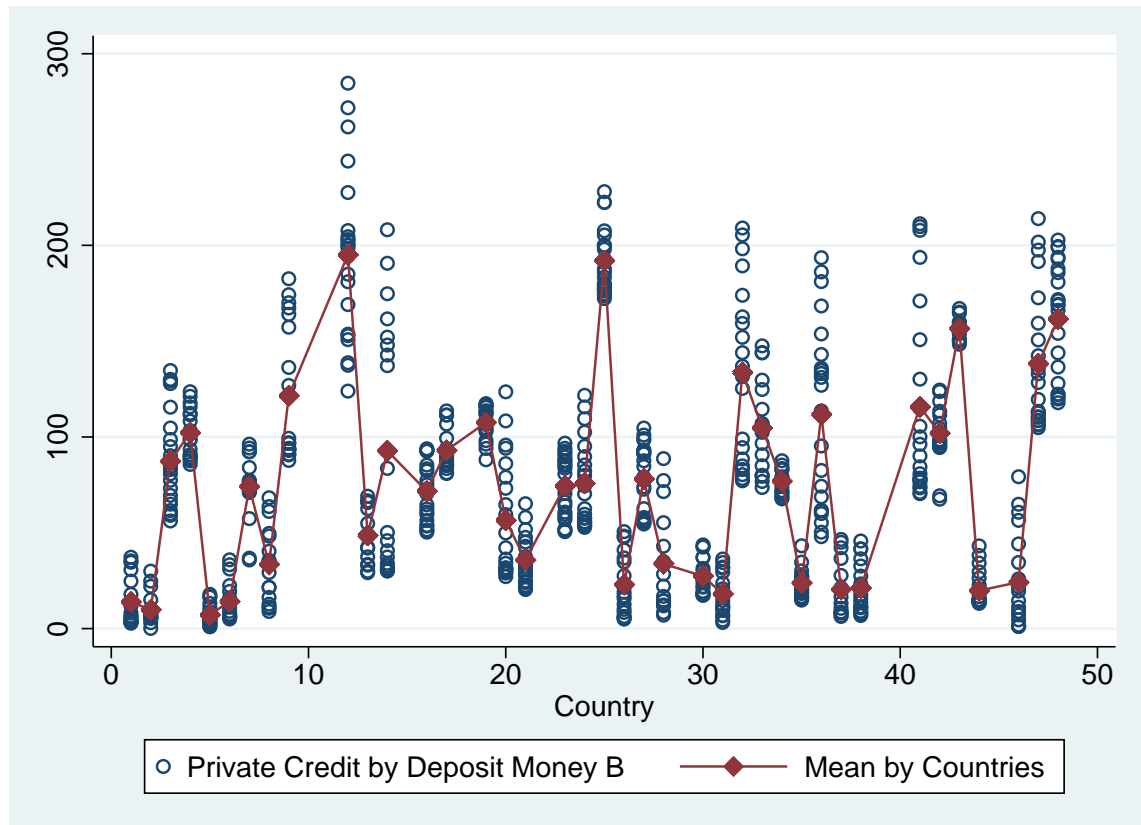
A measure of financial depth (size) that arguably is the most widely used in empirical papers is private credit to GDP. Particularly, the variable represents the amount of inner private credit provided to the real economy inside a country by banking sector and the measure is represented in percentages. According to the definition of the proxy, it does not include amount of credit issued to governments, to public institutions and state owed companies. Financial resources provided by central banks lay out of the measure as well.

Financial depth, measured by private credit to GDP varies across countries with a large scale, and it is strongly linked with GDP per capita level. For instance, private credit to GDP in developed market countries is on average four times bigger than in developing market countries and the value in high-income countries is around 100 percent. Analyzing the measure, countries with deep financial system geographically can be found in Europe. Other topping economies are Canada, South Africa and Australia. Concerning the emerging market countries, China's financial system according to the proxy is topping others like Brazil, India, Russia and Turkey. United States' financial system according to the measure is lagged behind the level of china and is listed above countries with average level. The reason of it most likely is that United States' financial sector relies on financial markets more than other counties do (Čihák *et al.* 2012).

Furthermore, financial depth expressed by private credit to GDP, is strong correlated to long-run real growth and it is as well statistically linked to level of poverty decrease. However, one could argue that a very high ration of

financial depth expressed by private credit/GDP does not necessarily mean a positive sign for an economy. For example the highest ratios of the measure had following eight countries: Cyprus, Spain, Ireland, Portugal, Netherlands, United Kingdom, Luxembourg and Switzerland and indeed the listed countries had the highest economic fluctuations since the 2008 recession.

Figure 3.2: Bank private credit to GDP - Means across counties



Source: GFDD

Figure 3.2 represents a scatter plot of between Bank private credit to GDP and counties. It illustrates the obvious differences across countries and highlights the heterogeneity of the data.

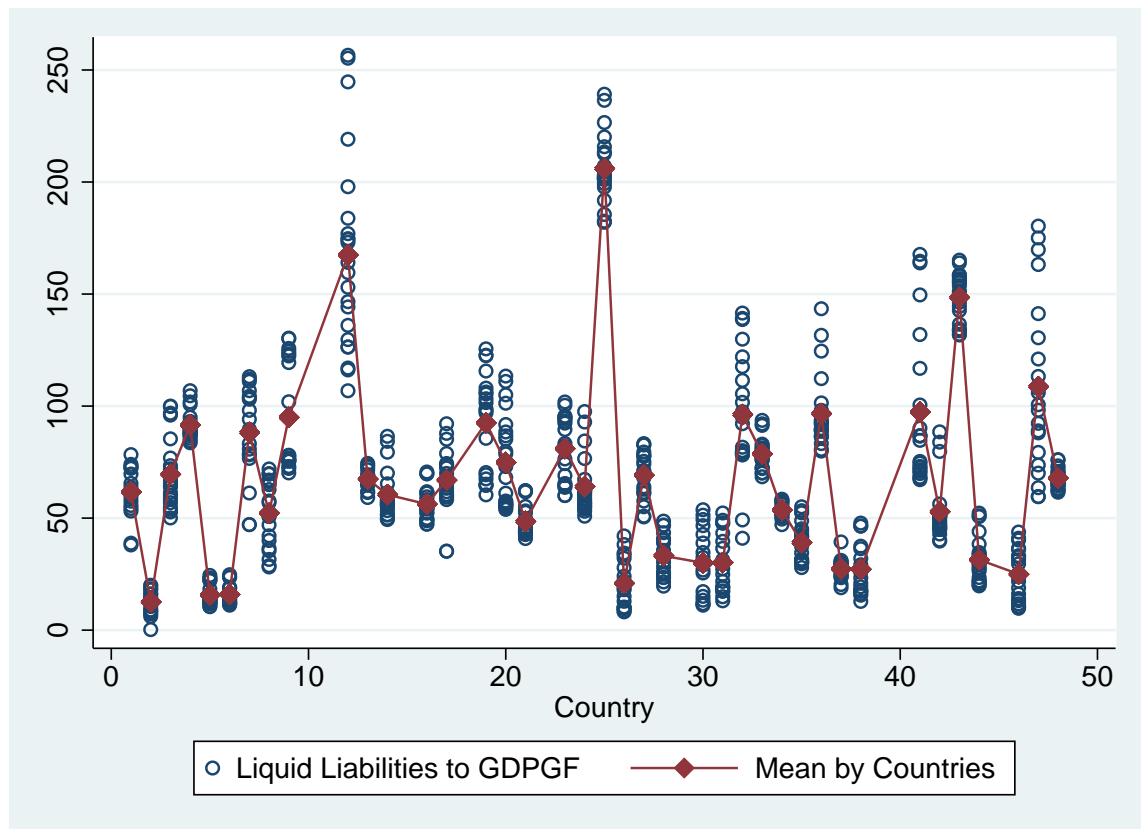
Liquid liabilities to GDP

An alternative measure to estimate depth (size) of a county's financial sector is Ratio of liquid liabilities to GDP. Liquid liabilities are so call broad money denoted by M3. The measure represents (1) a sum of central bank currency and accumulated deposits-M0; (2) added electronic currency and transferable saving such as transferable money deposit-M1; (3) added time deposits, saving

deposits, foreign currency convertible deposits, securities of repurchase transactions and securities of money savings; (4) added deposits in foreign currency, commercial papers, traveler's checks and shares of market funds or mutual funds (Čihák *et al.* 2012).

Liquid liabilities to GDP represents a broad measure of the depth of financial system expressed in percentages compared to gross domestic products. While quasi-liquid liabilities include only M2 aggregate. Valickova, Havranek, & Horvath (2014) sum up the existing literature why one might argue using broad money. According to the paper, using of M3/GDP mainly is motivated because the measure of money and quasi money to gross domestic product-M2/GDP, is limited in the countries where the money are widely used as a store of value (Yu, Hassan, & Sanchez 2012).

Figure 3.3: Liquid Liabilities to GDP - Means across counties



Source: GFDD

Figure 3.3 confirms similar characteristics of Liquid liabilities to GDP and Bank private credit to GDP datasets. The scatter plot and the means of Liquid liabilities to GDP vary by a large extent across countries that prove heterogeneity of the time data.

3.2.2 Measures of Explanatory Variables

The Freedom in the World survey - Political Freedom

A number of studies associate fundamental set of institutional development to be based on the democracy, a political mechanism which supports population involvement in the decision making process, public figures are elected based on fair elections and governments are under the rule based control. Haber *et al.* (2008) provided arguments that political freedom and openness should lead to the openness and better performance of a country's financial sector as well. Democratic mechanism is guarantee of population participation in a competitive policymaking process that leaves governments without instruments to affect negatively on financial sector based on behavioral hazard and private benefits. The result is a developed financial system which is more efficient in allocating and distributing financial streams. The same reasoning was drawn by a number of other empirical and theoretical works.

However, Recent empirical paper by Yang (2011) argued that the empirical results are fragile to panel data estimation. Albeit, the cross sectional estimations showed the impact of democracy on financial development to be significant, the link disappeared when the author applied the panel data estimation and fixed effects model, which deals with endogenous across variables and takes into account country specific factors. The same results were drawn for democracy effects on stock markets development.

Our study reexamine the conclusion using panel data and the FE estimation. However, a different proxy measure - Political freedom Index by the Freedom House Survey is applied in the thesis.

The Freedom in The World survey has been prepared since 1972 on a yearly basis. The variable assesses the freedom difference across different countries situated in different region and with diverse political systems and economic environments. The survey and other Freedom house reports are actively used by government and non-government institutions in decision making process. (FreedomHouse 2014)

The Freedom in the World survey presents a yearly estimation of increase and downfall of freedom level across 195 sovereign countries and 14 territorial entities. It combines reports with detailed summaries, as well the digital measurements of the country ratings. The measurement incorporates two board subgroups: political rights (PR) and civil liberties ratings(CL). The two categories further can be decomposed as follows:

Political rights is estimated based on the three subgroup variables:

- Process of election
- Level of participation and political pluralism
- Government functioning

Civil liberties evaluation includes four components:

- A level of freedom of expression and freedom of belief
- Rights associated with freedom to join or leave existing groups of organizations
- Rule of law
- Protection of individual right and personal freedom

Political rights and civil liberties both are evaluated in the range [1; 7] on a yearly basis. Evaluation with 1 represents the highest indicator of freedom and vice versa is true for 7. the rating itself are constructed by assigning a set of points up to 100 that is counted from the questionnaire: 10 questions to assess political rights and 15 question - civil liberties. Each question gives a country from 0 to 4 points, where 0 means the lowest level of freedom and 4 means the highest level. The next step step is formation of freedom rating. The freedom rating is calculated from the averaged points of the PR and CL. And at the end each country is assigned specific freedom status according to its averaged freedom points as follows:

Free (1.0 - 2.5), Partially Free (3.0 - 5.0), Not Free (5.5 - 7.0)

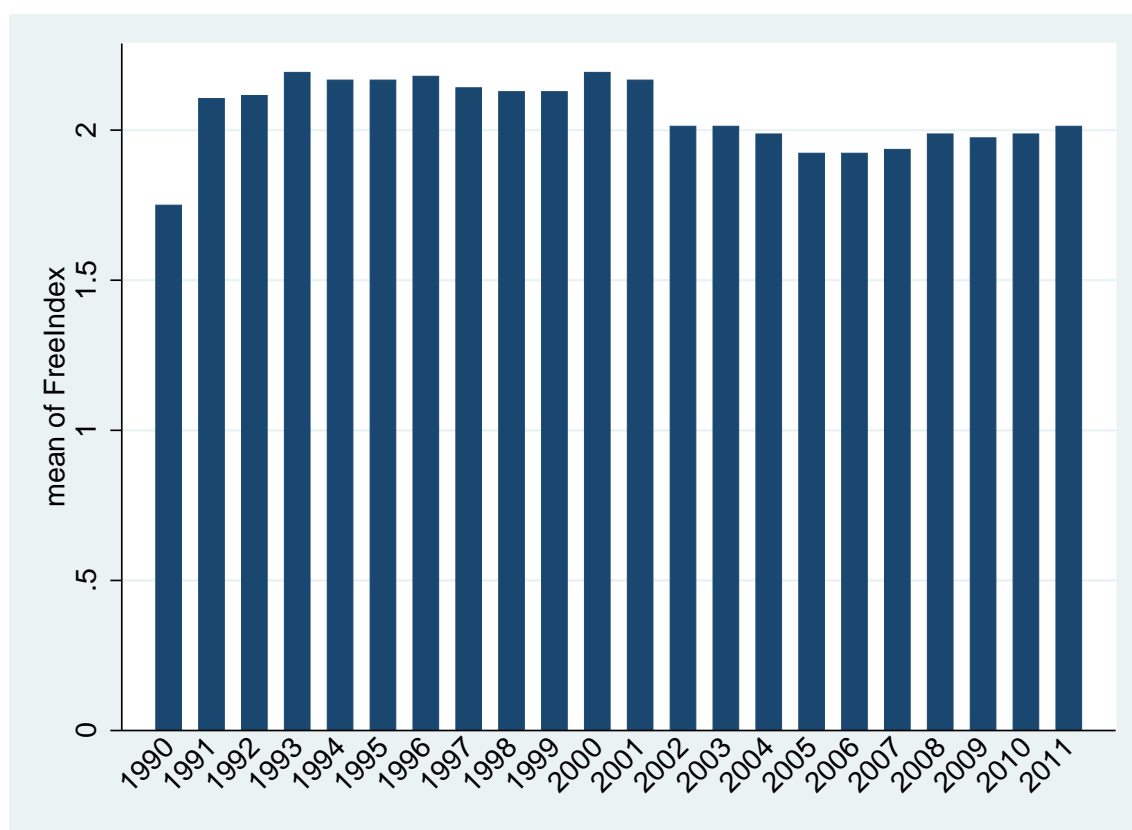
The more detailed subgroup estimations are also available for countries whose sub-indicators where affected but final results did not change. Analysis of that aspect is out of goals of the paper.

Figure 3.4 depicts sample means from 1990-2011. Excluding the shift in 1990, the index was decreasing gradually, effectively meaning that democracy and freedom level trend was improving.

The Freedom House survey control for cultural differences in estimating level of freedom and offers generalized estimation that is built on the worldwide accepted standards of political and civil rights. the Universal Declaration of Human Rights is the ground rules of estimation that is applied to all sovereign

countries and other entities. Geographical location, belonging to the different ethical, cultural and religious groups and the real economic level of a country is irrelevant for the survey. Furthermore, even though the indicator assesses a number of different political variables, the measure provided is not meant to estimate a government's overall performance, since the measure in many states is affected from the non-government factors such as paramilitary groups or other influential institutions. (FreedomHouse 2014)

Figure 3.4: The Freedom in the World Survey - Political Freedom Index



Source: The Freedom House

Measure of Capital Account Openness - KAOPEN

Rajan & Zingales (2003) distinguish that the decision of openness policy might be driven by a government's political decisions. On the other hand main motivator of openness policy could be objectively established economics situation which supports a country's involvement in a global economy. For example, there might be incumbents, an influential economic companies that gain benefits by openness policies or it might be forced even by the existing external

factors. As a result a countries' capital account openness measures should be categorized as a 'de facto' and 'de jure' measures. Since evaluation of country independent factors is out of scope of our paper we utilize 'de facto' measure of countries' capital account openness - KAOPEN index originally derived by Chinn and Ito.

There are a list of dummy variables that evaluate a country's capital account openness base on some specific characteristics. For our purposes that type of measure are less useful, since they provide only the extreme levels of a countries' openness: 1 for financially open countries and 0 for financially not open countries. As a result the dummy measures are not good to apply for the precise variability across the countries. Therefore we suggest that the variability of the Chinn and Ito index which takes values between $[-2; 2.5]$ is more suitable for explaining yearly variation of dependent variables across counties.

KAOPEN is derived from a set of dummy measures that are calculated based on the restrictions on financial operations across countries. The dummy variables are reported in the IMF's AREAER (Annual Report on Exchange Arrangements and Exchange Restrictions). Before 1996, the index considers the four main dummy variables that describes restrictions on across country financial operations. The measures applied are:

- k_1 a indicator of the multiple exchange rates across countries
- k_2 a indicator of the restrictions on current account operations
- k_3 an indicator of the restrictions on capital account operation
- k_4 a indicator of the requirement complexity on exports of goods and services.

The method of classification in the AREAER was changed in 1996 and the four groups were further decomposed in more detailed subgroups in order to capture the complexity of the polices assessing the capital control. Particularly, k_3 aggregate was dividing into 13 subgroups. Chinn & Ito (2006) follow the specification suggested by Mody & Murshid (2005) when extending the index after 1996.

Since the purpose of the index is to reflect level of financial openness and not the level of capital account control, the authors reverse the values of the binary measure. In addition, k_3 measure for restrictions on capital operations

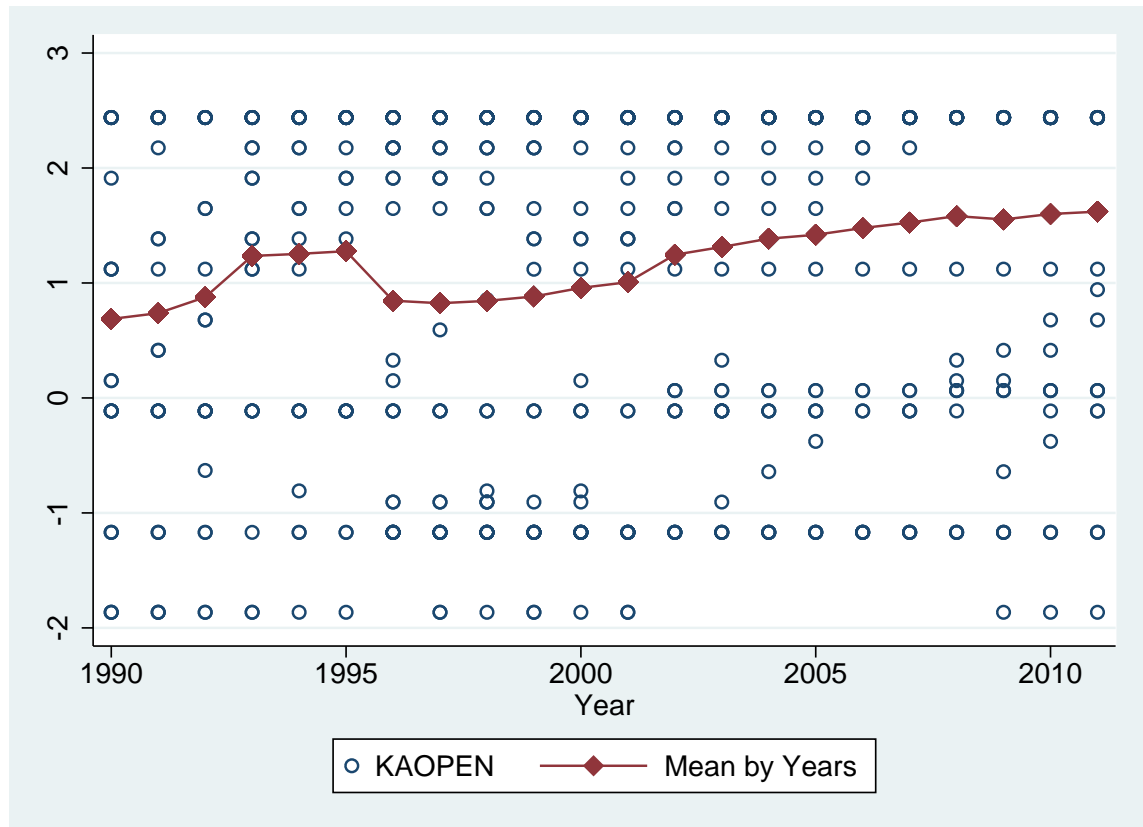
is not incorporated in the index directly. Instead, a new measure is created SHAEk3 that captures five years period, period t and the previous four.

$$SHAek_{3,t} = \frac{k_{3,t} + k_{3,t-1} + k_{3,t-2} + k_{3,t-3} + k_{3,t-4}}{5} \quad (3.1)$$

The final step in the index construction is incorporating all the components $k1t$, $k2t$ SHAREk3, $k4$ and the first standardized principal component is the index KAOPEN. The higher value KAOPEN takes the more financial openness it means across the countries.

Chinn & Ito (2006) suggest that the specification leads to more precise capturing of the level of the capital openness. Particularly, Chinn and Ito openness index arguably is able to capture more meticulously the differences in intensity of capital controls and to scale the financial openness of a country. As

Figure 3.5: KAOPEN index - averaged 1990-2011



Source: Chinn & Ito (2006).

it is well observable from Figure 3.5 that the average of the KAOPEN index increased for the last two decades. The change means that countries have taken steps towards deeper capital account openness. The trend is in line with the changes in financial development depth measures.

Other Explanatory Variables

Gross domestic product per capita

The topic whether financial development promotes real growth or the reverse causality is true has been an arguable for many economists. The supply-leading hypothesis argues causal relationship from FD to economic growth which we have already discussed. In contrast to such reasoning, demand-side view argues that economic development causes increase in demand for financial resources and financial sectors have to follow trend of economic development.

Calderón & Liu (2003) studies the causality effects between financial development and economic growth. The study based on the pooled data of 109 industrial and developing countries suggested that, generally, financial development causes economic growth. However the results also suggested that the Granger causality from FD to economic growth and the Granger causality from growth to financial development exist side-by-side and the two phenomena do not eliminate each other. Moreover, Greenwood & Jovanovic (1990) suggest that high rate of economic growth reduces transaction and financial intermediation cost since higher rate of economic development results larger amount of funds that is available for investment. The natural outcome also is raise of competitive environment in financial sector and boosting financial development. Levine (2005) addresses the same topic, whether income per capita is important factor affecting the financial development. The empirical results from 23 developing market countries indicated statistically significant positive effect of real income on financial development.

We include GDP per capita (in constant USD dollars) in the model. The two main reasons of including the variable in the regression are: first, the measure is necessary to control for the wealth effects and second, since we do not include separate measures of institutional quality and technological development level, the GDP per capita will serve as a good proxy of the level of institutional development. As several studies suggest there is a strong correlation between the GDP per capita variable and the level of institutional overall development and it's effectiveness (López de Silanes *et al.* 1998; Beck *et al.* 2003).

Trade Openness - Total trade to GDP

We similarly to the paper by Baltagi, Demetriades, & Law (2009) utilize the fraction of total trade of goods and services to GDP as a proxy of trade openness. The data is from the WDI.

A number of studies addressed link between financial development and trade. As Beck (2002) underlined financial development enhances large projects development and as a result a country develops a competitive advantage in manufacturing industry. The author by controlling county specific factors and reverse causality problems, suggested that better financial system are capable to boost exports and the difference between exports and imports for manufactured production. To sum up, the differences in countries financial systems could be an solid factor of comparative advantage in international trade.

An opposite causality is argued by Do & Levchenko (2004). The authors construct a model where financial development is endogenous and the results suggest that trade is positively linked to the development of financial system. In the model financial development is a product of a country's productive economic sectors. The specification comes from the observation that in countries with strong, financial intensive sectors have better developed and more effective financial systems. The other interesting finding drawn from the paper is that trade openness benefits rich countries more. The suggested explanation of such outcome is the fact that trade openness causes solid growth of financial intensive sectors in wealthy countries and as a results boost demand for financial services. The final outcome of the process is development of financial sector. The opposite is true for low income countries. Trade openness leads to shrink of financial intensive sectors, therefore demand for financial services falls decreases and the level of financial development declines.

Inflation - annual GDP deflator

Our model utilizes the level of inflation, expressed in GDP deflator. As the empirical research by Boyd, Levine, & Smith (2001) argues there is a significant negative effect of inflation on the banking sector and financial markets development. The study provides an empirical evidence that higher inflation disturbs capability of the financial institutions to effectively allocate and distribute financial resources.

In contrast to Boyd *et al.* (2001), Krugman (2014a) and Krugman (2014b) suggest that inflation rates in EU and US are too low and the problem of 'lowflation' is present. Therefore the author argued that dramatic increase in inflation at 4 percent level could boost economic activity. As a result one could suggest that higher inflation could lead faster development of financial sector as well.

Tax to GDP

The requirement to pay taxes in local currency provides a legal ground for money demand and consequently enhances the level of financial development. The empirical studies suggest that the level of taxation is positively linked to financial sector development in emerging market countries. However, high rate of taxation decreases money demand and suppresses the depth of the financial system (Tatom & Ott 2006).

Central government debt, total to GDP

In contrast to most of studies we include the fraction of public debt to GDP in our model. The existing literature does not indicate which measure of public debt is the most relevant in terms of determining the financial sector development. Moreover, most of empirical studies assessing the determinants of financial development did not incorporate a variable of public sector debts and the works that did found results to be not significant (Boyd *et al.* 2001). However, there is a theoretical arguments both for and against public debts role in financial development. On the one hand, the effect of public debt is examined as a positive indicator since it provides relatively safe assets for financial institutions. The argument is called the ‘safe asset’ view. Contrary to that, there is a proposition called a ‘lazy banks’ perspective. ‘Lazy banks’ view suggest that the high level of public debt might support low scale development of banking sector and financial markets, since the financial institutions that mainly land to government institutions will have weak intensive to become more compatible and further develop itself Hauner (2009).

Most of widely utilized macroeconomic variables such as gross domestic product, GDP deflator or consumer price index follow the specification based on the worldwide stand. This is not true for public debt measure. Countries often does not follow the arranged global standards and as a result the measurement error might be preset. To minimize the problem we will use data from WDI which is based on international standards set by the World Bank.

The public debt according to the World Bank is the whole fixed term financial obligations to other institutions on a specific date. The public debt includes domestic and foreign financial obligations such as securities excluding shares, money deposits, currency deposits and loans.

3.3 Methodology

We examine the impact of above-mentioned political, institutional and macroeconomic factors on financial development in the OECD high income countries and the developing countries from Europe and central Asia (Table A.2). The empirical model specification is closely similar to the treatment Chinn & Ito (2002). However, we utilize more update database and extend the model by incorporating additional time-variant variables: the Freedom House Survey Index (FI), the fraction of tax revenues to GDP and total public debt.

Generally, the purpose of the thesis is to examine the long-term effects expressed as follows:

$$\begin{aligned} FD_t^i &= (\alpha_0 + u_i) + \alpha_1 FI_t^i + \alpha_2 KAOPEN_t^i + \alpha_3 GDPPC_t^i + \alpha_4 FD_{t-s}^i + \\ &= +\alpha_5 TO_t^i + \alpha_6 INF_t^i + \alpha_7 TAX_t^i + \alpha_8 PDebt_t^i + v_i^t \quad (3.2) \end{aligned}$$

where:

- FD_t^i is a level of an i county's financial development at time t ;
- FI_t^i is the Freedom House Survey Index;
- $KAOPEN_t^i$ is the Chinn and Ito index of financial openness;
- $GDPPC_t^i$ is gross domestic product per capita, which also serves as a proxy measure of institutional quality;
- FD_{t-s}^i measures i country's financial development at time $(t - s)$
- TO_t^i stands for trade openness captured by a fraction total trade to GDP;
- INF_t^i is an inflation level, expressed by GDP price deflator;
- TAX_t^i is a measure of a fraction total tax revenues to GDP;
- $PDebt_t^i$ is a measure of central government debt, total to GDP;
- $(\alpha_0 + u_i)$ takes into account heterogeneity of the data and provides different intercepts for each country.

A number of other explanatory variable could have be incorporated in the model, but we similarly to Baltagi *et al.* (2009) employ a reasonably small

number of independent variables, so that to maintain interpretability of the existing correlations.

A number of empirical studies conclude the specification as suggested by the equation (3.2) can not properly control for the secular drifts. The main reason is the high scale business cyclical variations in the measures. Therefore we will use alternative specification suggested by Chinn & Ito (2002):

$$\begin{aligned} FD_t^i - FD_{t-5}^i &= (\alpha_0 + u_i) + \alpha_1 FI_{t-5}^i + \alpha_2 KAOPEN_{t-5}^i + \alpha_3 GDPPC_{t-5}^i + \alpha_4 FD_{t-5}^i + \\ &= +\alpha_5 TO_{t-5}^i + \alpha_6 INF_{t-5}^i + \alpha_7 TAX_{t-5}^i + \alpha_8 PDebt_{t-5}^i + v_i^t \quad (3.3) \end{aligned}$$

The equation can be interpreted the following way: the financial development rate is explained by the political factors, capital account openness level, government taxation policy, trade openness, institutional quality, inflation, public debt and previous level of financial development. All the independent variables are lagged for 5 years.

There are two reasons to follow the alternative specification. First, utilizing the long time horizon of 5 years is an effective way to shrink the correlations caused by the financial cyclical fluctuations. Second, linking the financial development growth rate at t period to the explanatory variables at $(t-5)$ period provides an effective tool to diminish existing endogeneity obstacle presented in the database.

Furthermore, if in the regression the where level of financial development or it's growth rate is explained by GDP per capita, capital account openness and other explanatory variables, would be based on yearly basis, one could argue that there is a two way causality effects. For example: positive correlation of GDP to capita and financial deepening measure could be explained both ways without knowing assertively the causality relation between the variables, since economic development can enhance the financial development and the the relation can be vice versa as well. The five year period analysis diminishes the problem, however it does not fully solve it. The drawback of the model clearly is losing data because of averaged dependent variable and lagged explanatory variables (Chinn & Ito 2002).

In contrast to the paper of Chinn & Ito (2002) that utilizes OLS and 2SLS models, in our empirical study we will apply the panel dataset fixed effects estimator (FE). It is reasonable estimation method for our cross-country data given the fact that unobserved factors across countries are correlated with the level of financial development. Using only time-series and cross-sectional models most

likely will provide inconsistent and biased results as far as county specific unobserved factors are present and these two models are not good in dealing with heterogeneity problem. The main advantage of FE estimator is that it takes into account the unobserved factors, which are correlated to response variable. FE model considers two types of unobserved variables: (1) factors that are time invariant but change across countries and (2) factors which change over time dimensions and across countries. Using simple transformation FE model successfully deals the problem described above and it is capable to provide robust estimates even in case of large number of unobserved independent variables. Nevertheless, this obvious advantage of FE model over time-series and cross sectional models is not achieved without tradeoff. The main drawback of the model is its failure to estimate time constant variables (Wooldridge 2010)

In panel data estimation, using a Hausman test, we will check if the random effect model or the fixed effect model is appropriate for our analysis. However, the FE model is usually well suited for analyzing the impact of variable that vary over time. The model explores the relationship between explanatory and response variables within entities. Each explanatory variable has its own characteristics that might or might not affect explained variable.

Table 3.1 provides descriptive statistics for the selected explanatory variables. In the table overall mean, std. deviation, minimum, maximum and number of observations are presented. Most of countries in our sample have a high evaluation in political freedom index, consequently setting the mean of the index around 2. Furthermore, the table indicates that average of the fraction total trade to GDP is at 77 percent, indicating that on average countries have open economies.

Table 3.1: Descriptive Statistics for the Explanatory Variables

Variable	Mean	Std. Dev.	Min.	Max.	N
Pol Freedom	2.057	1.469	1	6.5	848
kaopen	1.207	1.519	-1.864	2.439	782
GDPPC	20256.149	15927.18	565.156	67804.546	858
TotalTrade	77.346	31.572	15.924	180.501	855
Inflation	51.513	261.246	-18.93	4107.297	851
TaxToGDP	19.818	7.325	6.787	59.373	558
CentGovDebt	58.644	37.728	4.577	261.729	446

Source: author's computations

More detailed summary table can be seen in the Appendix A. Figure A.4

additionally provides description across between and within dimensions of the dataset.

Table 3.2: Correlation between Bank private credit to GDP & Liquid liabilities to GDP

	M3toGDP	PrCreditGDP
M3toGDP	1	
PrCreditGDP	0.8672	1

Source: author's computations

The correlation level between the two measure of financial development and the theoretical reasoning supports a suggestion that explanatory variables in regressions assessing the (1)Bank private credit to GDP and (2)Liquid liabilities to GDP should yield the same signs of coefficients. The sign prediction of coefficients based on our hypotheses and theoretical framework is following (Table 3.3):

Table 3.3: Sign Prediction for the Independent Variables

Pol Freedom	kaopen	GDPPC	TotTrade	Inflation	TaxToGDP	CentGovDebt
-	+	+	+	-/+	-	-

Source: author's computations

Political Freedom index estimating a country level freedom should have a negative effect because of the measurement specification: higher value of index means a country is less free.

A bulk of theoretical literature suggests that institutional development and as a result financial growth rate should be dependent on the democracy and freedom, a political system that promotes competition in elections and deeper population involvement the derision making process. Such a political regime is also a guarantee for rule based control of government, that limits possibility of misbehavior based on moral hazards. It can be argued that the competitive political system enhances effectiveness of financial systems (Haber *et al.* 2008). Contrary to the suggestions an empirical study by Yang (2011) argued that democracy has a significant positive effect on the depth of financial system only when cross sectional data analysis is applied, but once the analysis is treated with panel data models minimizing the endogeneity problem, significance of the relation between the two variables disappears. Our study aims to recheck conclusion drawn by Yang (2011).

TaxToGDP variable is predicted to have a negative sign. Albeit one can argue that higher taxes is legal ground to higher demand of local currency and financial development, we expect the effect to be less important for the selected countries (Table A.2). Based on the literature review we predict taxes to have a negative effect of financial development, since higher taxes are associated with repression of financial system.

According to our hypothesis we expect that size of financial sector has negative or close to zero coefficient.

We expect other variables KAOPEN index, GDPPC and TotalTrade to yield the same coefficient signs as describe by Chinn & Ito (2006) and Baltagi *et al.* (2009). For public debt level, we predict the correlation to be negative.

The Table 3.4 illustrates correlation among the explanatory variables. The results do not indicate existence of too strong inter-correlation among the explanatory variables that could lead to multicollinearity problem.

Table 3.4: Correlation among the Explanatory Variables

	GDPPC	FreeI.	kaop	TotalT.	Inf.	Tax.	C.G.Debt
GDPPC	1						
Pol Freedom	-0.6499	1					
kaopen	0.6961	-0.7726	1				
TotalTrade	-0.2377	0.1588	-0.2274	1			
Inflation	-0.3066	0.4843	-0.4424	0.1878	1		
TaxToGDP	0.2462	-0.2609	0.1099	0.1575	-0.0785	1	
CentGovDebt	0.157	-0.3475	0.2365	-0.0905	-0.1829	0.3869	1

Source: author's computations

Chapter 4

Title of Chapter Four

4.1 Chapter Overview

Objective of the empirical study is to examine determinants of financial development and providing data based evidence evaluating the hypotheses of our interest. In this chapter above described empirical specification (Equation 3.3) is applied. In order to address edogeneity problems associated with short term business cycles, the model is constructed as a growth rate of FD on existing level of independent variables lagged by 5 years regression and closely follows the specification suggested by Chinn & Ito (2002).

We categorize the potential determinants of financial development into 8 components: (1)political factors captured by the Freedom in the World Survey index, (2)'de jure' capital account openness (KAOPEN), (3)real income per capita, (4)existing size of financial sector compared to GDP, (5)trade openness, (6)GDP deflator, (7)tax revenues and (8)public debt. We run regressions for different explanatory variables: (a)Bank Private Credit to GDP and (b)Liquid liabilities to GDP and provide robustness checks of our suggestions by utilizing alternative measures of political freedom and dropping insignificant variable to check stability of the regression output.

The literature studying determinants of financial development often provides controversial suggestions. We will empirically verify a number of questions. Recent empirical paper by Yang (2011) argues that statistically significant link between democracy and financial development disappears once panel data estimation is applied. Our study checks the suggestion using fixed effects estimation technique. We also address effects of capital account openness, real per capita income, level of financial development, price level, and total tax

revenues to GDP on rate of financial development.

The chapter also includes detailed interpretation of the results and comparative analysis to the results from previous studies.

4.2 Model Specification - Bank Private Credit to GDP

We estimate the panel data using fixed effects model. The model as already mentioned in the methodology section usually is the most suitable approach to deal with heterogeneity across counties. Existence of the heterogeneity is highlighted in the data description part of the thesis Figure 3.2. Furthermore, the Hausman Test proves our assumption that the model should best suited for our estimation.

Table 4.1 depict the regression output. F test indicates that there is a significant fixed country effects in the data and the FE model is correctly selected.

Free Index (β_1)

The regression indicates the Freedom Index to be significant at .10 significance level. The negative sign of the coefficient comes from the Freedom Index specification. Since 1 is highest evaluation of freedom and democracy and 7 for the lowest scale, (-) sign is in line with our suggestion that more freedom and democracy enhances financial development. The result is in line with our predicted sign.

Yang (2011) suggested that democracy has a significant empirical effect on financial sector depth only when cross sectional data analysis is applied. However once panel regression is utilized, the author argued coefficient's level of significance disappeared.

In contrast to the empirical paper by Yang (2011), we find political freedom and democracy to have a significant effect on financial development for the selected region (Europe and Central Asia and OECD countries) even with panel data estimation which diminishes endogeneity problem. To see robustness of the hypothesis suggesting the positive correlation between democracy and financial development, we will utilize a different measure from the project PolityIV to describe political regime characteristics according to different variable.

Table 4.1: Fixed-effects Regression for **5 Years Growth Rate of Bank private credit to GDP**, Std. Err. Adjusted for 32 clusters in County (1990-2011)

Variable	Coefficient (Std. Err.)
Political Freedom	-21.211 [†] (12.477)
kaopen	8.228** (2.484)
GDPPC	0.005** (0.001)
PrCreditGDP	-0.583** (0.135)
TotalTrade	-0.137 (0.241)
Inflation	0.023 (0.016)
TaxToGDP	2.024* (0.861)
CentGovDebt_ln	-6.300 (9.877)
Intercept	-32.848 (75.532)
N	256
R ²	0.473
F _(7,31)	15.895

+ p<0.1, * p<0.05, ** p<0.01

Note : All regressors are lagged by 5 years

Source: author's computations

kaopen (β_2)

One of the stated hypotheses was that there is a strong positive correlation between financial openness and the rate of financial development. Based on analysis of the Table 4.1, second row indicates the positive effect of capital account openness on the financial development. The results are in line with Chinn & Ito (2006), Baltagi *et al.* (2009) and other empirical studies that capital account openness can boost financial development. There is a significant positive inter-correlation between capital financial openness and financial development. The statistical significance of the β_2 is at the .05 level.

GDPPC (β_3)

The theoretical framework suggested that GDP per capita has a significant positive impact on the financial development. The Table 4.1 empirically confirms that GDP per capita is positively correlated to the financial development. The β_3 coefficient is at the .05 level. The main reason is that the variable explains the wealth effects. Countries with higher per capita income tend to have better financial systems. Furthermore, since our empirical specification does not include variables describing the institutional development in the model, GDPPC measure additionally serves as a proxy measure of institutional quality and its scale of development. Usually there is a strong link between these two measures.

The work does not incorporate measures of institutional development, since they are time invariant or change insignificantly over twenty years period and we will not be able to effectively check the results by fixed effects estimation. Additionally, we do not consider including separate institutional variables necessary considering that (1) GDP per capita as mentioned above can serve as a good proxy of institutional quality and (2) we do not aim to check link between institutional developments and financial development.

Size of Financial System (β_4)

The result indicate previous size of financial development to have a negative effect on the rate of financial deepening. The 95 percent confidence interval is [-0.8572679;-0.3078852].The outcome supports our the hypothesis that deep financial system does not guarantee higher rate of financial development.

TaxToGDP (β_7)

The regression output depicts positive link between total tax revenues and financial development rate. The result is in contrast to the predicted sign of β_7 coefficient. We suggested that the effect of taxes should have been negative on financial development, since it causes repression of financial sector and as a result slow rate of financial development.

A possible explanation of such inter-correlation is described by Gilbert & Ilievski (2011). The authors suggest that fraction of tax revenues to GDP describes the size of public sector rather than fiscal pressure on a financial sector and argues that the public sector size and the depth of financial system co-emerges due to changes in technology and overall development level of a country. Moreover, Gilbert & Ilievski (2011) provides an empirical evidence that the fraction of the tax revenues as a share of GDP is higher in better developed countries than in developing countries.

A demand side explanation of the reasoning is simple one: better developed countries have stronger requirements and demand for public projects. Another explanation is that low tax-to-GDP ratio could be a reflection of existing problems in tax collection enforcement mechanisms or existence of an informal economic sector.

Other Explanatory Variables

Our model with response variable bank private credit to GDP does not detect significance of following coefficient $\beta_5, \beta_6, \beta_8$.

4.3 Model Specification - Liquid liabilities to GDP

The regression with response variable Liquid liabilities to GDP yields similar results as the model with Bank private debt to GDP and supports the robustness of the above discussed interpretations (Table 4.2). However there are a few meaningful differences.

First, we find the Free Index coefficient to be significant at .05 significance level compared to .10 from the previous one. Furthermore, the 95 percent confidence interval is strongly negative.

The results indicate higher level of significance for TaxToGDP variable (at .01 confidence level) providing stronger evidence supporting the suggestion that tax revenues and banking sector development are positively correlated. The

Table 4.2: Fixed-effects Regression for **5 Years Growth Rate of Liquid liabilities to GDP**, Std. Err. Adjusted for 32 clusters in County (1990-2011)

Variable	Coefficient (Std. Err.)
Political Freedom	-20.674* (8.861)
kaopen	2.268 (2.418)
GDPPC	0.004** (0.001)
M3toGDP	-0.696** (0.125)
TotalTrade	-0.160 (0.130)
Inflation	0.060* (0.023)
TaxToGDP	2.721** (0.888)
CentGovDebt_ln	-5.639 (8.706)
Intercept	-29.462 (66.343)
N	272
R ²	0.495
F _(7,31)	9.66

+ p<0.1, * p<0.05, ** p<0.01

Note : All regressors are lagged by 5 years

Source: author's computations

results are opposite to our initial prediction of the variable coefficient and are supporting arguments by Gilbert & Ilievski (2011). Apparently total taxes does not describe well the level of fiscal stress exclusively on financial sector, but it is a proxy measure of products and services provided by public sector. Therefore it is intuitive that countries with higher level of technological and economic development have higher demand for public good. As a result for the selected sample of countries, TaxToGDP and FD indicators are co-emerging. It is an interesting question to test whether the results would be similar for tax levels exclusively on financial sectors. However, the topic is out of scope of current thesis.

Inflation (β_6)

In contrast to the regression with Bank private credit to GDP, in the specification with liquid liabilities to GDP inflation has a significant coefficient at .05 significance level.

The coefficient of inflation rate is positively linked to the rate of financial development. Albeit there are controversies in the theoretical framework concerning the inflation effects on the rate of financial development, one could argue that it is in line with the recent suggestions by Paul Krugman.

Krugman (2014a) in his recent blog argued that there is ‘the Inflation Obsession’. The author states that the obsession is persistent for a long period and did not change even during the crisis. As an example he illustrates that on the meeting the day after Lehman fell inflation was mentioned 322 times, while unemployment and systematic risks only 28 and 19 times relatively.

The idea is developed in another blog by Krugman (2014b) that suggests that in the US and Europe inflations are too low and destructive for economic development. The conclusion is supported by I.M.F. research which discusses problems that might be caused by the ‘lowflation’. The article also provides the comparison for US and UK. Historical experience supported the idea that the country (US) that was willing to reduce real size of its debt by letting inflation to be loose, could perform better than a country (UK), which did not consider violation of orthodox fiscal and monetary approach. However, Krugman argues that final conclusions of the I.M.F. report is somewhat modest to say straightforward the finding that it implies.

The author suggests that it is vital to finish ‘lowflation’. Low level of inflation according to Krugman (2014b) supports existence of liquidity traps -

a situation when real interest rate at 0 can not restore full employment level. The liquidity traps also is supported by the global tendency of investors to save money 'safe' and do not reinvest available funds. Finally the blog calls for heterodox measure, which would increase inflation target at 4 percent level. The author think that modest changes will not be able to finish liquidity trap.

Since the main hypothesis of the study assesses political freedom effects on the rate of financial development, in the next part of the paper we will apply an alternative measure of political regime and level of democracy in the selected countries.

4.4 Robustness Checks

4.4.1 Analysis with Polity2 Index

We, run above described regression with an alternative measure of political factors, and particularly the level of democracy. The regression is run for the same sample of countries (Table A.2) and provides a good opportunity to compare the specifications for Free Index vs polity2 index.

Measurement of political freedom and democracy with high accuracy could be extremely difficult. Therefore the regression results where proxy of political openness is Free Index might have suffered from the poor measurement. To recheck above mentioned determinants impact on the rate of financial development, we run a regression with an alternative variable measuring level of institutionalized democracy.

Polity2 index itself is calculated based on two complex measures DEMOC and AUTOC, relatively describing institutionalized democracy and autocracy (Marshall & Jaggers 2002).

DEMOC

The variable takes values from 0 to 10, relatively for a country with now democracy and for a country with the highest level of democracy. DEMOC is a proxy measure of institutionalized democracy which has three essential components that are independent from each other:

1. Existence of institutions that can guarantee that population can effectively express their choices and choose public officials from alternative political forces and leader;
2. Existence of rule based procedures that are capable to constrain the hazardous use of power by the public figures;
3. Existence of guarantees for the population to exercise civil liberties. . . .

According to the variable an absolute democracy would have the following characteristics: political involvement is absolutely competitive; public positions are elective; there is a substantial law based limitations on the public executives.

AUTOC

The variable measures level of institutionalized autocracy, also referred as authoritarian regime. The main characteristics of the authoritarian political systems are as follows:

1. The regime clearly limits political competition and restricts political freedom;
2. Political leaders are assigned based on decision of political elites;
3. One the political leaders are exercising their power, there is few or no constraints limiting their behavior. ...

Similarly to the index DEMOC, the variable AUTOC ranges from 0 to 10, as mentioned combined and revised score of the two measures is Polity2 index.

In contrast to Free Index, higher numerical value of Polity2 index represents higher level of democracy. Table 4.3 depicts high negative correlation between Freedom Index and Polity2 index. Therefore, we expect the coefficient of the variable to be significant and positive.

Table 4.3: Correlation between Polity2 and The Freedom Index

	polity	Political Freedom
polity2	1.0000	
Political Freedom	-0.8633	1.0000

Source: author's computations

Table 4.4 presents a descriptive summary of the variable Polity2. Similarly to the Freedom index, mean of Polity2 variable highlights that most of the countries have institutionalized democracy.

Table 4.4: Descriptive Summary of Polity2 Index

Variable	Obs	Mean	Std. Dev.	Min	Max
polity2	831	7.914561	4.199388	-7	10

Source: author's computations

Polity2 variable is extracted from the Polity IV project. The variable measure indicates a country's combined score of democracy and autocracy. The variable is one of the most widely utilized in the empirical papers, since it is standardized for times series analysis and takes values in the interval $[-10; 10]$, where -10 describes a country with an absolute autocracy and 10 means highest level of democracy.

First we run the regression for Bank private credit to GDP with explanatory variable Polity2, an alternative measure of freedom and democracy.

Table 4.5: Fixed-effects Regression for **5 Years Growth Rate of Bank private credit to GDP**, Std. Err. Adjusted for 32 clusters in County (1990-2011)
With an Alternative Explanatory Variable Polity2

Variable	Coefficient (Std. Err.)
polity2	3.855* (1.825)
kaopen	10.160** (2.896)
GDPPC	0.006** (0.001)
PrCreditGDP	-0.583** (0.145)
TotalTrade	-0.161 (0.221)
Inflation	0.029* (0.014)
TaxToGDP	1.336 (1.130)
CentGovDebt_ln	-1.386 (8.680)
Intercept	-130.441* (62.453)
N	250
R ²	0.454
F _(7,30)	15.003

+ p<0.1, * p<0.05, ** p<0.01

Note : All regressors are lagged by 5 years

Source: author's computations

Table 4.6: Fixed-effects Regression for **5 Years Growth Rate of Liquid liabilities to GDP**, Std. Err. Adjusted for 32 clusters in County (1990-2011)
With an Alternative Explanatory Variable Polity2

Variable	Coefficient (Std. Err.)
polity2	3.498 (2.121)
kaopen	4.734 [†] (2.595)
GDPPC	0.005** (0.001)
M3toGDP	-0.614** (0.158)
TotalTrade	-0.178 (0.126)
Inflation	0.059* (0.023)
TaxToGDP	1.936 [†] (1.085)
CentGovDebt_ln	0.608 (7.311)
Intercept	-127.558* (51.152)
N	266
R ²	0.457
F _(7,30)	8.852

+ p<0.1, * p<0.05, ** p<0.01

Note : All regressors are lagged by 5 years
Source: author's computations

Table 4.5 illustrates the results of the regression. Signs and level of significance of the coefficients are similar to the specifications with the explanatory variable Political Freedom.

Polity2 variable has a positive effect on the rate of FD at the .05 significance level. We find the coefficient of the variable to be relatively small in absolute value compared to regressors Political Freedom coefficient. The observation is easily interpretable taking into account that Polity two varies in the range [-10;10], while the Political Freedom takes values in a shorter range from 1 to 7.

The regression reflects coefficients of lagged variables - *kaopen*, *GDPPC* and size of financial sector to be statistically significant at .01 significance level. The sign of the variables' coefficients are as expected by the hypotheses of the thesis: increase in capital account openness and real income per capita leads to higher rate of financial development; the size of the financial sector has (-) sign indicating that for the selected countries deeper financial sector does not cause better rate of FD.

The coefficient of inflation is also in line with aforementioned suggestions. Positive dependence of financial development on the level of GDP deflator supports reasoning by Krugman (2014b), which stated that US and EU countries have a 'lowflation' and monetary injections could be beneficial.

Table 4.6 table depicts the results from the regression for 5 years growth rate of the Liquid liabilities to GDP Polity2 index and a vector of aforementioned independent variables. Compared to the regression results illustrated by Table 4.5, Polity2 has weaker significance, at the 10.1 % level. For the other variables we find the same inter-correlation signs.

To recapitulate above discussed results from the retrogressions we include a summarizing table in the Appendix A. Table A.1 contains regressions' coefficients for Bank private credit to GDP and Liquid liabilities to GDP on a vector of independent variables and two alternative measures of political freedom and democracy. The empirical part of the thesis outlines the following statistical evidence for the OECD countries and developing countries in Europe and Central Asia (Table A.2):

Political freedom and democracy is observed to have positive effects on the financial development rate. The main specification with Political Freedom as a independent variable and with an alternative measure Polity2 supports the hypothesis that political freedom and particularly, protection of political

rights and civil liberties can enhance financial development. The coefficient are significant at .05 significance level for (2) and (3) regressions and at 0.1 for (1) and (4) specification (Table A.1).

Similarly, to studies by Chinn & Ito (2006) and Baltagi *et al.* (2009), we find capital account openness to be positively correlated to financial development rate. The main regressions and the robustness checks depicted that financial openness promotes rate of increase of Private credit to GDP with larger scale than it enhances Liquid liabilities to GDP.

For all lagged variables of financial sector size, empirical study of the thesis suggests that countries with deep financial sector do not necessarily have higher rate of financial development. The coefficients of lagged financial development variables are significant at .001 and negative for all the four specifications.

As expected real income per capita has a positive correlation on the rate of FD. It can be seen from the Table A.1 that GDPPC has a positive coefficient and is significant at .001 significance level for all the four regressions. However the coefficients are close to 0, which could be interpreted that increase in per capita income will not boost rate of FD in a large scales.

The empirical part of the study finds inflation to have a positive effect on financial development. The results are significant at .05 significance level in the 3 models. Only first specification indicates statistical insignificance of the coefficient. One could argue that the results are in line to the suggestions by KRUGMAN, that US and European countries might be facing too low inflation rates. As a result, higher inflation could support economic activity and deepening of financial sector.

In contrast to our predicated sign, we find total tax revenues coefficient to have positive impact on the level of financial development. The results are significant for (1) regression at 0.05 significance level, for (2) - at 0.01 and for (4) - at 0.1. The Table A.1 depicts coefficients of total tax revenues to be positive for all four regressions. One could suggest the following explanation: the variable total tax revenues to GDP do not exclusively measure fiscal pressure on financial system. However the variable is an important determinant of financial development rate, since it is a proxy of amount of goods and services produced by the public sector. More tax revenues means a government will finance more projects and produce more public goods. Taking into account the reasoning Gilbert & Ilievski (2011) argued that level of tax revenues and financial development co-emerges as country technological and economic level increases.

4.4.2 Analysis with dropped Total Trade variable

Lastly, we check whether our initial results are stable once a statistically insignificant dependent variable is dropped from the regression. All above presented regressions underline that total trade to GDP, as a sum of imports and exports of goods and services, does not have a statistically significant effect of financial development. We drop the variable to compare stability of initial output depicted by the Table 4.1 and the Table 4.2

Table 4.7: Fixed-effects Regression for **5 Years Growth Rate of Bank private credit to GDP**, Std. Err. Adjusted for 32 clusters in County (1990-2011)
Robustness Check by Dropping Regressor Total Trade

Variable	Coefficient (Std. Err.)
Political Freedom	-22.402 [†] (11.808)
kaopen	8.202** (2.549)
GDPPC	0.005** (0.001)
PrCreditGDP	-0.579** (0.137)
Inflation	0.021 (0.015)
TaxToGDP	2.020* (0.878)
CentGovDebt_ln	-7.052 (10.004)
Intercept	-29.552 (76.266)
N	256
R ²	0.47
F _(6,31)	16.569

+ p<0.1, * p<0.05, ** p<0.01

Note : All regressors are lagged by 5 years

Source: author's computations

According to the Table 4.7 and Table 4.8, the results stay stable even once the total trade is dropped from the regression. We find that with the modified

Table 4.8: Fixed-effects Regression for **5 Years Growth Rate of Liquid liabilities to GDP**, Std. Err. Adjusted for 32 clusters in County (1990-2011)
Robustness Check by Dropping Regressor Total Trade

Variable	Coefficient (Std. Err.)
Political Freedom	-21.482* (8.864)
kaopen	2.031 (2.556)
GDPPC	0.004** (0.001)
M3toGDP	-0.688** (0.124)
Inflation	0.058* (0.025)
TaxToGDP	2.682** (0.919)
CentGovDebt_ln	-6.565 (8.875)
Intercept	-25.972 (67.163)
N	272
R ²	0.488
F _(6,31)	9.201

+ p<0.1, * p<0.05, ** p<0.01

Note : All regressors are lagged by 5 years

Source: author's computations

specification Political Freedom to have statistically significant effect on the rate of financial development, Bank Private Credit to GDP and Liquid Liabilities to GDP, at .10 and .05 significance level relatively.

Similarly to political freedom, other results also does not change sign of coefficient and mainly their numerical values stay close to baseline output results. For instance, it is observable that real GDP per capita, GDP deflator level and total tax revenues to GDP maintain statistically significant positive coefficients and level of financial development also has statistically significant inverse effect on the rate of financial development. However for Kaopen index, we find results to stay statistically significant only in the Table 4.7 at .01 significance level. The empirical evidence from the Table 4.8 suggests that once trade openness ‘de facto’ measure is dropped from the regression, statistical significance of the Kaopen index disappears.

Based on the afore discussed theoretical and empirical study the following chapter provides final remarks and conclusions.

Chapter 5

Conclusion

The positive link between financial development and economic growth motivated us to study determinants of financial development. We applied a model where rate of financial development was regressed on the level of financial development and on the vector of other explanatory variables, including measures of (1) political freedom and democracy, (2) capital account openness, (3) real income per capita, (4) total trade, (5) GDP deflator, (6) total tax revenues and (7) public debt. All regressors were lagged by five years to mitigate endogeneity problem.

Fixed effects estimation technique was applied in the empirical study. The model is a reasonable estimation approach for the panel data given the fact that unobserved factors across countries are correlated with the level of financial development. We collected data for 39 countries from various sources: the World Bank's GFDD and WDI, the dataset associated with Chinn & Ito, the Freedom in the World Survey from the Freedom House and Polity2 index from the PolityIV project. To diminish endogeneity problem and to treat cyclical correlations of the dataset, we applied specification similar to Chinn & Ito (2002; 2006), which is using 5 year horizon: a 5 years growth rate of financial development is estimated by the rate of financial development and a vector of other explanatory variables, where all regressors are lagged by 5 year.

We see econometrical verification of positive link between electoral democracy and rate of financial development as the main contribution of the study. We utilized two alternative measures of political factors to evaluate effects of political freedom on the rate of financial development, as measured by bank private credit to GDP and liquid liabilities to GDP. All results supported the suggestion that competitive political system can spur financial development.

Other findings of the study are: our results confirm financial openness hypothesis suggesting that capital account openness leads to financial development; we also find real per capita income to have a positive and statistically significant coefficient in the regressions, while the size of financial sector is inversely linked to the rate of financial development; Based on the results, it seems for the selected countries that price level measured by GDP deflator and the fraction of total tax revenues to GDP to be positively linked to the rate of financial development.

The observed results are robust when alternative measures of political freedom is applied and coefficients of the regression reveal to be stable once insignificant explanatory variable is dropped from the regression.

For further research, it is interesting to check whether taxes on financial sector will yield the same results as the variable - total tax revenues to GDP. Also more thought has to be given to the differences between developed and developing countries. Due to shortage of the data of emerging market countries we do not address the problem comprehensively, therefore the results presented might not be fully applicable for middle income countries.

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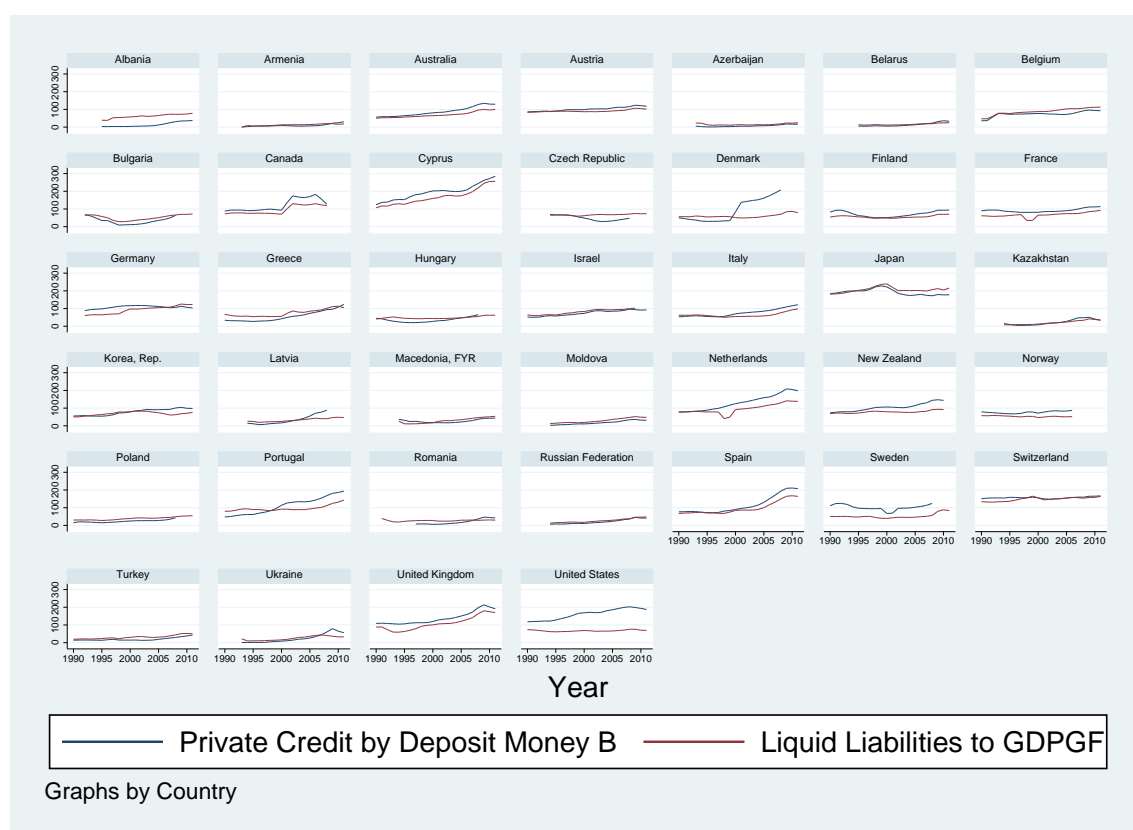
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Appendix A

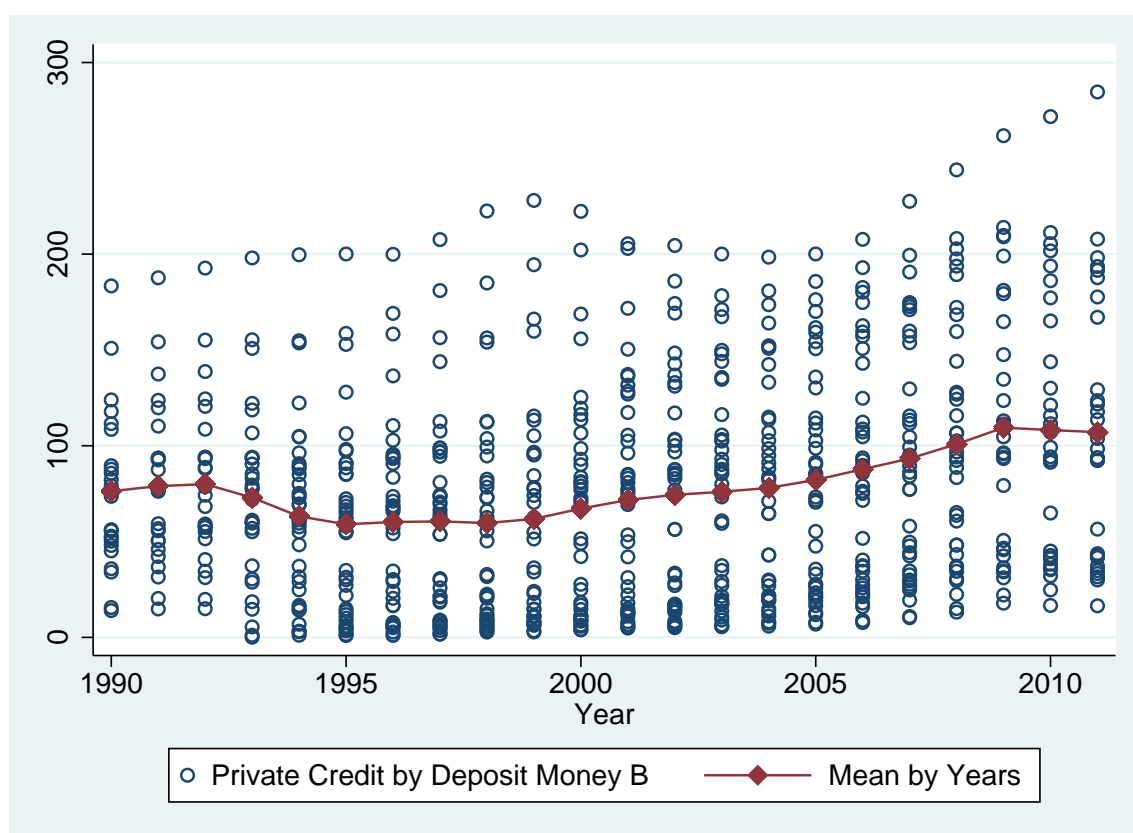
Description of Variables and County List

Figure A.1: Bank Private Credit to GDP, Liquid Liabilities to GDP
(1990-2011)



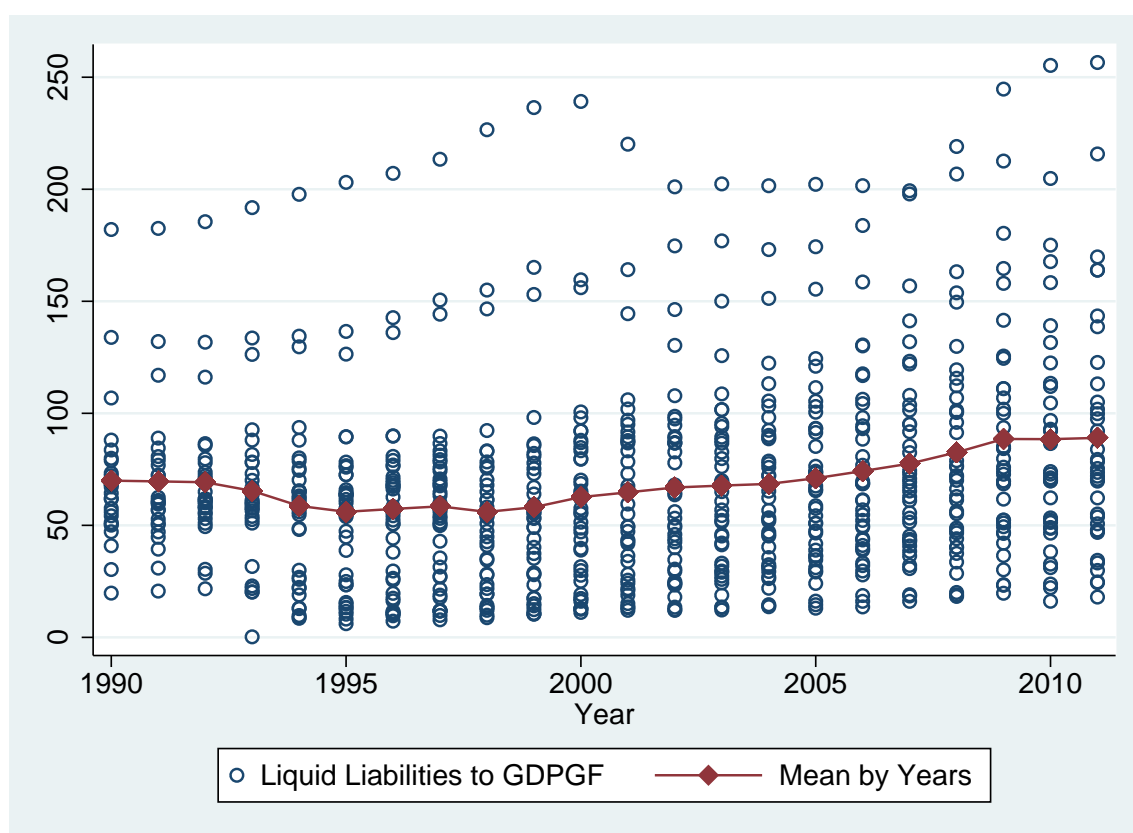
Source: Author's computations

Figure A.2: Mean of Bank Private Credit to GDP (1990-2011)



Source: Author's computations

Figure A.3: Mean of Liquid Liabilities to GDP (1990-2011)



Source: Author's computations

Figure A.4: Descriptive Statistics for Explanatory and Response Variables

Variable		Mean	Std. Dev.	Min	Max	Observations
PrCredit	overall	77.82349	57.8318	.1152023	284.6218	N = 766
GDP	between		52.22739	7.224279	195.1233	n = 39
	within		25.04888	6.625986	193.2056	T-bar = 19.641
M3toGDP	overall	68.98041	44.68423	.2478361	256.5764	N = 795
	between		41.56117	12.60284	206.0832	n = 39
	within		16.61108	8.435756	158.1651	T-bar = 20.3846
kaopen	overall	1.207024	1.518946	-1.863972	2.439009	N = 782
	between		1.365715	-1.342614	2.439009	n = 39
	within		.7783565	-1.317331	3.584276	T-bar = 20.0513
Free	overall	2.057193	1.468873	1	6.5	N = 848
Index	between		1.44081	1	5.761905	n = 39
	within		.4154526	-.2047114	4.966284	T-bar = 21.7436
GDPPC	overall	20256.15	15927.18	565.1557	67804.55	N = 858
	between		15842.81	847.0234	58686.67	n = 39
	within		2971.695	6259.115	29374.03	T = 22
Total	overall	77.34646	31.57204	15.92399	180.5012	N = 855
Tradeto	between		28.15625	22.85051	142.9676	n = 39
GDP	within		14.88883	11.95678	137.9191	T-bar = 21.9231
TaxToGDP	overall	19.81827	7.325087	6.787221	59.37311	N = 558
	between		6.970244	9.833259	43.85023	n = 39
	within		2.501928	1.738722	35.34114	T-bar = 14.3077
Inflat.	overall	51.5126	261.2456	-18.92973	4107.297	N = 851
	between		90.59428	-.5081443	313.3819	n = 39
	within		245.7204	-256.7474	3853.832	T-bar = 21.8205
CentGov.	overall	58.64421	37.72829	4.576538	261.7287	N = 446
Debt	between		37.61706	5.752375	159.7126	n = 35
	within		13.86768	.314662	165.3077	T-bar = 12.7429

Source: Author's computations.

Figure A.5: Hausman Test

```

Hausman test - Bank private credit to GDP Regression

      b = consistent under Ho and Ha; obtained from xtreg
      B = inconsistent under Ha, efficient under Ho; obtained from xtreg

Test:  Ho:  difference in coefficients not systematic

      chi2(7) = (b-B)' [(V_b-V_B)^(-1)] (b-B)
            =      276.91
      Prob>chi2 =      0.0000
      (V_b-V_B is not positive definite)

Hausman Test - Liquid liabilities to GDP Regression

      b = consistent under Ho and Ha; obtained from xtreg
      B = inconsistent under Ha, efficient under Ho; obtained from xtreg

Test:  Ho:  difference in coefficients not systematic

      chi2(7) = (b-B)' [(V_b-V_B)^(-1)] (b-B)
            =      217.59
      Prob>chi2 =      0.0000
      (V_b-V_B is not positive definite)

```

Source: Author's computations

Table A.1: Regression Output for Bank private credit to GDP and Liquid liabilities to GDP on vector of independent variables and two alternative measures of political freedom and democracy

	(1)	(2)	(3)	(4)
	PrCreditGDP(1) Coef.	M3toGDP(1) Coef.	PrCreditGDP(2) Coef.	M3toGDP(2) Coef.
Political Freedom	-21.211+	-20.674*		
polity2			3.855*	3.498
Kaopen	8.228**	2.268	10.160**	4.733+
GDPPC	.004***	.004***	.005***	.004***
FD_{t-5} PrCreditGDP	-.582***		-.582***	
FD_{t-5} M3toGDP		-.696***		-.613***
TotalTradeGDP	-.136	-.159	-.160	-.178
GDPdeflator	.023	.059*	.029*	.059*
TaxGDP	2.024*	2.721**	1.335	1.936+
CentGovDebt	-6.300	-5.639	-1.386	.608
Constant	-32.848	-29.461	-130.441*	-127.557*
Observations	256	272	250	266

+ p < 0.10, * p < 0.05, ** p < 0.01, *** p < 0.001

Note : All regressors are lagged by 5 years

Source: author's computations

Table A.2: Country List (39 Countries)

	Country Name	Income Group	Region
1	Albania	Upper middle income	Europe & Central Asia
2	Armenia	Lower middle income	Europe & Central Asia
3	Australia	High income: OECD	East Asia & Pacific
4	Austria	High income: OECD	Europe & Central Asia
5	Azerbaijan	Upper middle income	Europe & Central Asia
6	Belarus	Upper middle income	Europe & Central Asia
7	Belgium	High income: OECD	Europe & Central Asia
8	Bulgaria	Upper middle income	Europe & Central Asia
9	Canada	High income: OECD	North America
10	Cyprus	High income: nonOECD	Europe & Central Asia
11	Czech Republic	High income: OECD	Europe & Central Asia
12	Denmark	High income: OECD	Europe & Central Asia
13	Finland	High income: OECD	Europe & Central Asia
14	France	High income: OECD	Europe & Central Asia
15	Germany	High income: OECD	Europe & Central Asia
16	Greece	High income: OECD	Europe & Central Asia
17	Hungary	Upper middle income	Europe & Central Asia
18	Israel	High income: OECD	Middle East & North Africa
19	Italy	High income: OECD	Europe & Central Asia
20	Japan	High income: OECD	East Asia & Pacific
21	Kazakhstan	Upper middle income	Europe & Central Asia
22	Korea, Rep.	High income: OECD	East Asia & Pacific
23	Latvia	High income: nonOECD	Europe & Central Asia
24	Macedonia, FYR	Upper middle income	Europe & Central Asia
25	Moldova	Lower middle income	Europe & Central Asia
26	Netherlands	High income: OECD	Europe & Central Asia
27	New Zealand	High income: OECD	East Asia & Pacific
28	Norway	High income: OECD	Europe & Central Asia
29	Poland	High income: OECD	Europe & Central Asia
30	Portugal	High income: OECD	Europe & Central Asia
31	Romania	Upper middle income	Europe & Central Asia
32	Russian Federation	High income: nonOECD	Europe & Central Asia
33	Spain	High income: OECD	Europe & Central Asia
34	Sweden	High income: OECD	Europe & Central Asia
35	Switzerland	High income: OECD	Europe & Central Asia
36	Turkey	Upper middle income	Europe & Central Asia
37	Ukraine	Lower middle income	Europe & Central Asia
38	United Kingdom	High income: OECD	Europe & Central Asia
39	United States	High income: OECD	North America